JUNIOR REGIONAL GEOGRAPHIES

W. H. BARKER & LEONARD BROOKS

BOOK II

THE BRITISH ISLES

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REGIONAL GEOGRAPHIES

By W. H. BARKER, B.Sc., F.R.G.S.

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BY

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BOOK II
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WITH 48 ILLUSTRATIONS

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CONTENTS

CHAPTER		PAGE
I.	HOME	9
II.	ISLANDS AND SEAS	14
III.	HIGHLANDS AND LOWLANDS	24
IV.	FOOD AND CLIMATE	34
V.	THE PLAIN OF ENGLAND	47
VI.	SOUTH-WEST ENGLAND	61
VII.	WALES	70
VIII.	MOORLAND AND LAKELAND	81
IX.	INDUSTRIAL ENGLAND	94
X.	THE INDUSTRIAL REGIONS	101
XI.	THE SCOTTISH LOWLANDS AND UPLANDS	111
XII.	THE HIGHLANDS OF SCOTLAND	124
XIII.	IRELAND	140
XIV.	COMMUNICATIONS OF BRITAIN	154
XV.	BRITAIN AND THE WORLD	166

LIST OF ILLUSTRATIONS AND MAPS

FIG.		PAGE
1.	THE HIGH CHALK CLIFFS OF BEACHY HEAD	15
2.	THE BRITISH CONTINENTAL SHELF	17
3.	A SOUTH WALES PLATEAU SCENE	25
4.	THE HIGHLANDS AND LOWLANDS OF BRITAIN	27
5.	SKETCH-MAP SHOWING POSITION OF LINCOLN	30
6.	DISTRIBUTION OF RAINFALL, CATTLE, SHEEP, ETC.	36
7.	MAP OF AN ENGLISH VILLAGE	41
8.	AIR PHOTO OF CHESHAM BOIS	42
9.	MAP OF AN ENGLISH MARKET TOWN	43
10.	WARWICK FROM THE AIR	44
11.	MAP OF THE ENGLISH LOWLANDS	48
12.	STRUCTURAL MAP OF THE ENGLISH LOWLANDS	49
13.	SALISBURY PLAIN FROM THE AIR	51
14.	ROAD MAP AND SECTION FROM LUDLOW TO LONDON	56
15.	CHIEF ENGLISH CANALS	59
16.	MAP OF SOUTH-WEST ENGLAND	63
17.	RELIEF AND RAILWAY COMMUNICATIONS OF WALES	71
18.	RELIEF, COALFIELDS, AND RAILWAYS OF SOUTH WALES	75
19.	CARDIFF FROM THE AIR	77
20.	SECTION OF PENNINE CHAIN	82
21.	CHEDDAR CAVES	83
22.	MATLOCK BATH ON THE DERWENT	85
23.	MONSAL DALE	88
24.	HONISTER PASS IN THE LAKE DISTRICT	90
25.	MAP OF THE ENGLISH COALFIELDS	97
26.	MAP OF CENTRAL LOWLANDS OF SCOTLAND	112

FIG. PAGE

27. VILLAGE AND FARMS IN SOUTHERN UPLANDS 114
28. MAP OF THE SOUTHERN UPLANDS 115
29. THE POSITION OF STIRLING 118
30. THE POSITION OF EDINBURGH 119
31. EDINBURGH—CASTLE ROCK WITH PENTLAND HILLS IN DISTANCE . 121
32. DIAGRAMMATIC MAP OF SCOTLAND 125
33. SCENE AMONG THE LOCHS OF THE WESTERN COAST OF SCOTLAND . 126
34. RELIEF AND RAILWAY ROUTES OF THE SCOTTISH HIGHLANDS . . 128
35. THE MOORLANDS AND FARMLANDS OF SCOTLAND 129
36. BALLATER—A HIGHLAND SCENE 130
37. HIGHLAND SHEEP AND LAMBS 132
38. THE TROSSACHS—A BEAUTIFUL HIGHLAND SCENE 134
39. MAP OF THE RELIEF AND ROUTES OF IRELAND 141
40. THE GIANT'S CAUSEWAY 144
41. IRISH PEASANTS CUTTING AND STACKING PEAT 149
42. MANCHESTER SHIP CANAL 156
43. AIR PHOTO OF SALFORD DOCKS 158
44. PRINCIPAL RAILWAYS OF GREAT BRITAIN 160
45. WESTMINSTER BRIDGE AND WATERLOO STATION FROM THE AIR . 161
46. SCENE AT CROYDON AERODROME 163
47. AIR VIEW OF WEST INDIA DOCK, LONDON 167
48. BRITISH ISLES IN RELATION TO GREAT TRADE ROUTES . . . 169

PREFACE

This book is essentially descriptive of the regions into which the British Isles readily divide. The geographical story is simply told and is illustrated by maps and pictures which emphasise the salient facts presented. The book is intended for use in the upper classes of Elementary Schools and the lower forms of Secondary Schools, but it is hoped that it will prove useful wherever young students are making their first regional study of Britain.

W. H. B.
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BANGALORE

CHAPTER I

HOME

Your home may be in town or country. In the town there seems to be street after street of houses and road after road of shops. The country seems a great distance off, so far away that it is only visited during the week-end or holidays. In the village or small country town the green fields and hedgerows are not far away, while to go to " town " is often a special journey. Wherever we live, whether in town or country, there is much that we can learn by observing the things about our homes. Old names remain to fields and lanes, to yards and open spaces—Long Close, Manor Farm, Field Lane, Water Lane, Tanyard, The Cheap, and many more. All these had an interesting origin. Then, too, there may be the Mill Brook, though the mill has long since gone ; the Market Cross, though now perhaps there may not be a market. Just outside there may be farms with strange but interesting names—The Crossroads, Hall Farm, Foxholes, Holm Farm. How came the farms to have these names ? The church, too, may have much of interest. Perhaps it is a mile or so from the village, away in the midst of the fields, or on the top of some adjacent hill. Its doors and windows may not all be alike, some are round and

some are pointed. The village green may be quite a meeting-place of roads, and nearby may be the post-office and public house, the blacksmith's shop or the village store, where all kinds of things are sold. Why are these things so ?

The country town has many more things of interest. The High Street is part of a main road. Though now it is lined with shops, it was once probably only the street of a village, but the village has grown and become a market town. The open spaces are railed off for cattle pens, or left in front of the inns for farmers' carts and carriers' vans on market day. In the High Street shops of saddlers and ironmongers, provision dealers and tailors, contain the goods the farmer needs to buy ; while here and there are banks and the offices of solicitors and lawyers, where he may get help and advice on many important matters. Probably the village has grown into a market town because of its position, and at a later time the railway may have come, bringing in new industries such as the manufacture of agricultural implements or the making of beer or flour. Round the railway and the works a " new " town or a " low " town has probably grown up, with square-planned streets of plain uninteresting houses.

Some towns have grown until it is difficult to see how they began. Still, unless it is a new town which has grown up quickly on a coalfield, with new industries connected with coal and iron, we may learn much if we keep our eyes open. Old names remain and tell us much. The High Street is there, though inns and saddlers' shops may be gone, and in their place have grown large shops of all kinds with public

buildings and offices. Trams and buses may now run along the old country roads, but on the trams you will often see names of places that call to mind much that has now disappeared—Holborn, Newgate, Cheapside, Aldgate, Mile End, Stratford.

Everywhere we go, our homes remind us that men have lived and worked there, and have made a great difference between the original site as Nature prepared it and that which we see to-day.

And man is still at work. In village, market town, industrial town, and port work must be done, and it is interesting to learn what men do, what becomes of their work, and who provides them and their families with food—milk, vegetables, bread, meat, sugar, tea, clothing, as well as the timber, bricks, and stone for the houses and factories.

Our "home" is very interesting. It includes the house and its contents; the streets; the town or village as a whole; the surrounding district; the distant towns connected by road and rail; the country in which our home is placed; the great world in which we live and which supplies us with much that we require to make home pleasant and comfortable.

But our "home" consists of more things than these. Could we but go to homes in other lands, we should find that houses and streets, fields and roads, may be the same and yet we feel there is a difference. Sunshine and cloud, rain and snow, help to make our "home," and these depend upon our position on the great globe-like Earth which continuously rotates upon its axis while it revolves around the sun.

These two movements of the Earth give us the long warm days of summer and the short and often cold days of winter. In consequence we have a constant changing of the seasons following a certain order and completing the cycle of changes in a twelve-month. In the summer Nature puts on her brightest dress of green ; during the winter the trees are bare and often the ground is covered with a mantle of snow. As winter passes slowly to summer, the days lengthen, the sun mounts higher in the sky, and the hedgerows and trees show first the leaf-buds and then the blossom. Farmer and gardener sow and plant the fields and gardens, lambs frisk and play in the field, and birds sing out their sweetest tunes. It is spring-time and everything feels the coming of summer, the time of warmth and the production of food.

In the autumn, as summer passes slowly to winter, all again is activity in the field and garden. This time the farmer and the gardener must be busy gathering in the harvest of corn, fruits, and vegetables before the long winter sets in.

All these particular changes of weather and climate and the work which must be done according to the season help to make our " home." In other parts of the world the climate and the seasons are very different, and therefore so is also the work of man. Our home consists in part of what Nature gives us and in part of what we ourselves can make it. Man may alter the direction of the roads or pull down and rebuild in better style the buildings which he uses. But he cannot alter the path of the sun in the heavens nor turn away the storm. He cannot remove all the hills, nor can he fill in all the valleys.

To know our home we must look not only along the street to the market or the church, but also to the sky with the sun and moon. Not only must we know the towns and villages whence come the trains and cars which bring our food and clothing, but we must know also whence come the winds that bring the rain which water the fields and gardens giving food for man and beast.

SUGGESTIONS FOR PRACTICAL WORK

1. During the study of the home district record the facts on diagrams and sketches on scales varying with the distances to be covered. Compare these with the 25-in., 6-in., and 1-in. Ordnance Maps, noting how these show the roads, railways, churches, and so on, given on your own sketch-map.

2. Make observations throughout the year of such phenomena as the path of the sun across the sky, the height of the midday sun, the length of day, direction of wind, the work of the farmers, the appearance of trees, and so on. Where possible, relate the facts and also represent them in a graphical manner.

3. Try to construct a map of your home district as it was, say, a hundred years ago. Why has the district changed so much since then?

4. Make a list of all the things which go to make your "home."

CHAPTER II

ISLANDS AND SEAS

We have seen that to know our homeland we should know also its position on the Earth. By means of the globe we can see not only the position of the British Isles relative to the Equator, but, what is equally important, the position with regard to the distribution of the land and water on the surface of the Earth. The Old World consists of the vast area of Eurasia, i.e. Europe and Asia, together with the two southern continental projections of Africa and Australia. The New World consists of North and South America, separated from Europe and Africa by the Atlantic Ocean, and from Asia and Australia by the large Pacific Ocean.

All this land surface of the Old and New Worlds is not equally important, and to-day Europe and North America stand first in power and wealth, though both depend to a greater or less extent upon the peoples and products of other lands. Place your finger on the British Isles upon a globe, and you will notice that they stand where Europe and the North Atlantic meet. Across the ocean is the continent of North America, while ocean-routes connect these islands with all regions of the world. Four great seaways lead out from the North Atlantic, two round

FIG. 1.—THE HIGH CHALK CLIFFS OF BEACHY HEAD. *Photo by Central Aerophoto Co., Ltd*

Notice the lighthouse at the foot of Beachy Head and the character of the chalk country. What is the name of the town?

the continents of Africa and South America, the Cape and Horn routes; and two through the great inland Mediterranean and Caribbean seas, and known as the Suez and Panama routes from the ship-canals that join them to the oceans beyond (see Fig. 48).

It must be remembered, however, that great as this advantage is to Britain nowadays, until the building of big ships the ocean formed a barrier to the movements of men, and Britain remained in closest touch with Europe.

Where the white cliffs of Dover face the cliffs of north-east France, the sea-passage is little more than twenty miles across, and on a good day France can be seen quite clearly. So narrow is the Strait of Dover that a tunnel could, and some day will, perhaps, be made to connect the railway systems of England and France.

North and west of Dover the British coasts move farther away from the continent, separated from the mainland by the North Sea and English Channel.

Out on the west, the Atlantic Ocean makes a great sweep from the entrance to the English Channel to the northern entrance of the North Sea. Thus the British Isles are encircled by the sea, with Europe nearby across what have been called " The Narrow Seas " and America far away across the ocean.

Within this girdle of the seas, the British Isles consist of two large islands separated by the Irish Sea and the two entrances to it, of St. George's Channel and North Channel. In addition there are very many other islands considerably smaller in size which are really fragments of the larger islands separated by the sea. Some of these islands or

island groups are large enough to be compared in size with the English counties, having towns and villages scattered over the farm and pasture lands.

FIG. 2.—THE BRITISH CONTINENTAL SHELF.

Such are the Isle of Wight, Isle of Anglesey, Isle of Man, the Inner and Outer Hebrides, the Orkney and Shetland Isles. Others, though very small, are still

inhabited, as the Scilly Is., Lundy I., Farne Is., while smaller still are the hundreds of rocky islets whose only inhabitants are the sea-gulls and other birds.

The Channel Islands do not really form part of the British Isles, though they are under the same king and parliament as Britain. Geographically they form a French group of islands and represent all that is left of the French possessions once held by the English sovereign.

The British Seas which surround our isles and separate us are very shallow seas, though deep enough of course to float the largest vessels. Fig. 2 shows the difference between the sea-depth and the depth of the outer ocean. Indeed, the British Isles are seen to be but the highest parts of a great platform that stands out from the continent of Europe. They are really parts of the European mainland that have become detached by the inroads of the ocean. The seas have drowned the lowest parts of the great plain which otherwise would lie between the British highlands on the west and the European highlands of Scandinavia and Germany towards the east.

We owe much to these shallow and separating seas. Three hundred years ago Shakespeare wrote :

> " This royal throne of kings, this sceptr'd isle,
> This earth of majesty, this seat of Mars,
> This other Eden, demi-paradise ;
> This fortress, built by Nature for herself,
> Against infection, and the hand of war ;
> This happy breed of men, this little world ;
> This precious stone set in the silver sea,
> Which serves it in the office of a wall,
> Or as a moat defensive to a house,

Against the envy of less happier lands ;
This blessèd plot, this earth, this realm, this England.
. . . . . .
England, bound in with the triumphant sea
Whose rocky shore beats back the envious siege
Of wat'ry Neptune."

Richard II, Act II, Sc. I.

The seas, held by the British Navy, have in the past guarded our shores and have often kept us free from the ravages of war. Chatham, Dover, Portsmouth, and Plymouth stand as great naval fortresses along the coast where we have feared the greatest danger and where Nature has made the great entrances to England of the Thames Estuary and Southampton Water for peoples coming from the Continent. Thus, less molested than continental countries with land frontiers, the British have been able to build up at home great industries and businesses, and abroad to explore, to colonise, or to annex the lands which form our world-wide Empire.

Our debt to the seas is made still greater by their abundance of fish and the effects of the tides on our harbours. In the shallow waters of this temperate region fish find a great amount of food, brought partly by the rivers from the land and partly obtained from the numerous plants and seaweeds which can grow in shallow waters. All round the coasts are fishing-villages, some of those on the east having grown to important fishing-ports. East of the Yorkshire coast is a large area of shallow water known as the Dogger Bank. This is the richest fishing-ground in one of the richest fishing-seas in the world. Boats from all the countries round fish in these waters, but the British fleets are by far the

largest. From Lowestoft, Yarmouth, Grimsby, Hull, and even from as far north as Inverness steam trawlers go off to the banks, while fast steamers collect the "catch" from smack and trawler and hurry with it to the ports whence specially fitted express trains distribute the fish throughout the country.

We have said that the shallow waters give through the tides another great advantage. Far out in the Atlantic the tides are scarcely noticed, but in the shallow British Seas the difference between high and low tide is often very considerable, especially in funnel-shaped estuaries like those of the Severn, Thames, and Humber. How great is the difference which both the continental shelf and the funnel-shaped estuaries make can be seen from the following figures. Take first three places in the Bristol Channel—Pembroke at the entrance, Port Talbot higher up, and Portishead close to Bristol. High water at full moon is approximately 24 ft. (Pembroke), 31 ft. (Port Talbot), and 45 ft. (Portishead) above low water. Two facts are thus seen: one that the shelf makes a considerable difference in the depth of water at all the places on the Bristol Channel, and the other that the tide becomes higher the farther we proceed along the funnel. At Hull the depth of the water is increased approximately 20 ft. by the incoming tide, while the depth of water at the docks of London during high tide varies from 24 ft. to 29 ft.

This incoming of deep water twice in twenty-four hours up the lower channels and estuaries of the rivers enables large ports to be built well inland, many miles from the open sea. Often, indeed, ships can go up to where the river is sufficiently narrow to have a bridge

thrown across, as at London, Bristol, and Glasgow—a fact which makes the port still more important.

At such ports as these it is a common sight to see ships and barges, large and small, come upstream on the flowing tide and go downstream on the ebb. All London boys and girls living near the Thames are familiar with the long lines of barges which, borne by the tide, take timber, coal, and many other heavy articles upstream under the bridges, returning later with the ebb either empty or sometimes laden with cargo. A few may be seen in Fig. 45.

The cost of carrying goods by water is considerably cheaper than by rail. In countries like France and Germany the rivers have been "canalised"—that is, locks have been built to regulate the flow and depth of water, big loop-like curves have been cut out, and obstacles that blocked the river-bed removed. These rivers have then been connected by canals and at great cost a system of waterways has been constructed. In the British Isles the seas and tides serve the same purpose. Coasting vessels can carry goods from one port to another, especially as the tides enable them to get well up the river at certain times of the day.

In these days, too, the coastal waters serve another purpose. Britain, we shall learn, is one of the great workshops of the world, manufacturing iron and steel goods, woollens and cottons. These are sold in almost every country, and in exchange we obtain not only raw materials for manufacture, but food supplies of wheat, meat, tea, sugar, and many other goods. Britain has a world trade; the great highways of trade are the oceans, and ships form the vehicles of carriage.

Surrounded as we are by the sea, these ships can come and go from the ports that suit them best, instead of all vessels having to crowd within the docks of a single port. All round the coasts large ports exist, as London, Hull, and Newcastle on the east, Southampton and Plymouth on the south, Bristol, Cardiff, Swansea, Liverpool, and Glasgow on the west, and Belfast, Dublin, Cork, and Londonderry in Ireland. In addition to these, there are many smaller ports which do a fair amount of trade.

Our islands and seas must therefore be thought of together. Though we live upon the land, yet our life is influenced in a variety of ways by the surrounding seas. Sometimes, perhaps, shut off in our own little homeland, we have forgotten that beyond the seas are other homelands where other people dwell and upon whom, though we do not know them, we depend for much of the goods that make our home so comfortable and provide us with the food we need.

SUGGESTIONS FOR PRACTICAL WORK

1. The following table gives approximately the height of water at Hull during 24 hours on a particular day. Plot the numbers and state what you can learn from your graph.

Time.	Height of Water.	Time.	Height of Water.
12.0 midnight	15½ ft.	12.0 noon	15½ ft.
1.0 a.m.	12 ,,	1.0 p.m.	12 ,,
2.0 ,,	9 ,,	2.0 ,,	9 ,,
3.0 ,,	7 ,,	3.0 ,,	7 ,,
4.0 ,,	9 ,,	4.0 ,,	7 ,,
5.0 ,,	13½ ,,	5.0 ,,	10 ,,
6.0 ,,	17½ ,,	6.0 ,,	14½ ,,
7.0 ,,	22 ,,	7.0 ,,	18½ ,,
8.0 ,,	24 ,,	8.0 ,,	22 ,,
9.0 ,,	25 ,,	9.0 ,,	23½ ,,
10.0 ,,	23 ,,	10.0 ,,	23 ,,
11.0 ,,	19 ,,	11.0 ,,	22½ ,,

2. The following table gives the height of the high water at the London Docks during a lunar month. Plot the figures. What connections do you notice between the height of the water and the phases of the moon? What is the difference between this graph and the previous one?

Age of Moon:	High Water.	Age of Moon:	High Water
0 (new)	28½ ft.	15 days (full)	28 ft.
1 day	29 ,,	16 ,,	28½ ,,
2 days	28½ ,,	17 ,,	29 ,,
3 ,,	28 ,,	18 ,,	29 ,,
4 ,,	27½ ,,	19 ,,	28½ ,,
5 ,,	27 ,,	20 ,,	28 ,,
6 ,,	26½ ,,	21 ,,	27½ ,,
7 ,,	25½ ,,	22 ,, (Last Qtr.)	26½ ,,
8 ,, (First Qtr.)	25 ,,	23 ,,	26 ,,
9 ,,	24½ ,,	24 ,,	26 ,,
10 ,,	25 ,,	25 ,,	26 ,,
11 ,,	25½ ,,	26 ,,	26½ ,,
12 ,,	26 ,,	27 ,,	27 ,,
13 ,,	26½ ,,	28 ,,	27½ ,,
14 ,,	27 ,,	29 ,,	28 ,,

3. Show by sketches how the tidal currents may help to form such long sandy spits as Holderness and Spurn Head.

4. On an outline map of the world trace out the routes which ships might follow in bringing to Britain the following goods: wool from Australia to London; sugar from Jamaica to Bristol; wheat from Canada to Liverpool; palm kernels from West Africa to Hull.

CHAPTER III

HIGHLANDS AND LOWLANDS

Now let us look at the land and see the character of the country that stands on the continental shelf above the level of the seas. Few parts rise higher than 3,000 ft., and much is lowland where the hills seldom exceed 600 ft. above sea-level. The best and quickest way to see the highlands and the lowlands would be to have an aeroplane and fly across the country in many directions. Over many parts of Eastern England or Central Ireland we should see long stretches of flat country with big patches of various shades of green across which the lines of the roads are clearly seen. We should see the scattered farms, the villages and market towns dotted over the landscape with a network of lanes and roads connecting them with the great "trunk" roads of the country. Now and again would appear a bigger town, half obscured by smoke, towards which many roads converge like the spokes of a wheel into the hub.

Away to the north or west we should find that the land becomes more "hummocky," like enormous heaps of rock. As we approach, the aeroplane must needs rise higher, and instead of seeing long stretches of road with villages and towns dotted

Photo by Central Aerophoto Co., Ld.

FIG. 3.—A SOUTH WALES PLATEAU SCENE.

Notice the general level of the country and its rather bare character. To the right of the nearest farm is a lake which runs out through a gully to the right of the tower. Notice the steep rise from the lower land to the plateau.

along it, the winding road in the valley would play hide-and-seek among the mountains, and but for a few minutes only should we catch a glimpse of village or town nestling among the hills.

As such a flight is not possible for many of us, we must depend upon the maps. Some of these have been made to show the height of the land and the character of the country. What strikes us first on such a relief map is that all the highest masses are in the north and west. Scotland, North and North-west England, Wales, and all but Central Ireland are rugged and mountainous. England south of the Pennines and east of Wales is in comparison a large, square-shaped plain. We have seen already that " The Narrow Seas " are really the drowned portions of a large plain, and on either side of the seas the plain rises gradually above sea-level until beyond the English Plain stand the mountainous districts of Wales, and beyond the great North European Plain rise the plateaus of Central Europe.

From these two sets of northern and western highlands rivers flow to the North Sea and the English Channel. With few exceptions, the largest rivers of England flow eastward or southward, making large estuaries such as the Humber, the Wash, the Thames, and Southampton Water, which face the large European rivers Elbe, Rhine, and Seine, as well as The Sound and the Kiel Canal which lead into the Baltic Sea.

This distribution of highlands and lowlands, with the consequent river drainage and estuaries, has had a great effect on our island history. We have seen already how along the south and east coasts important

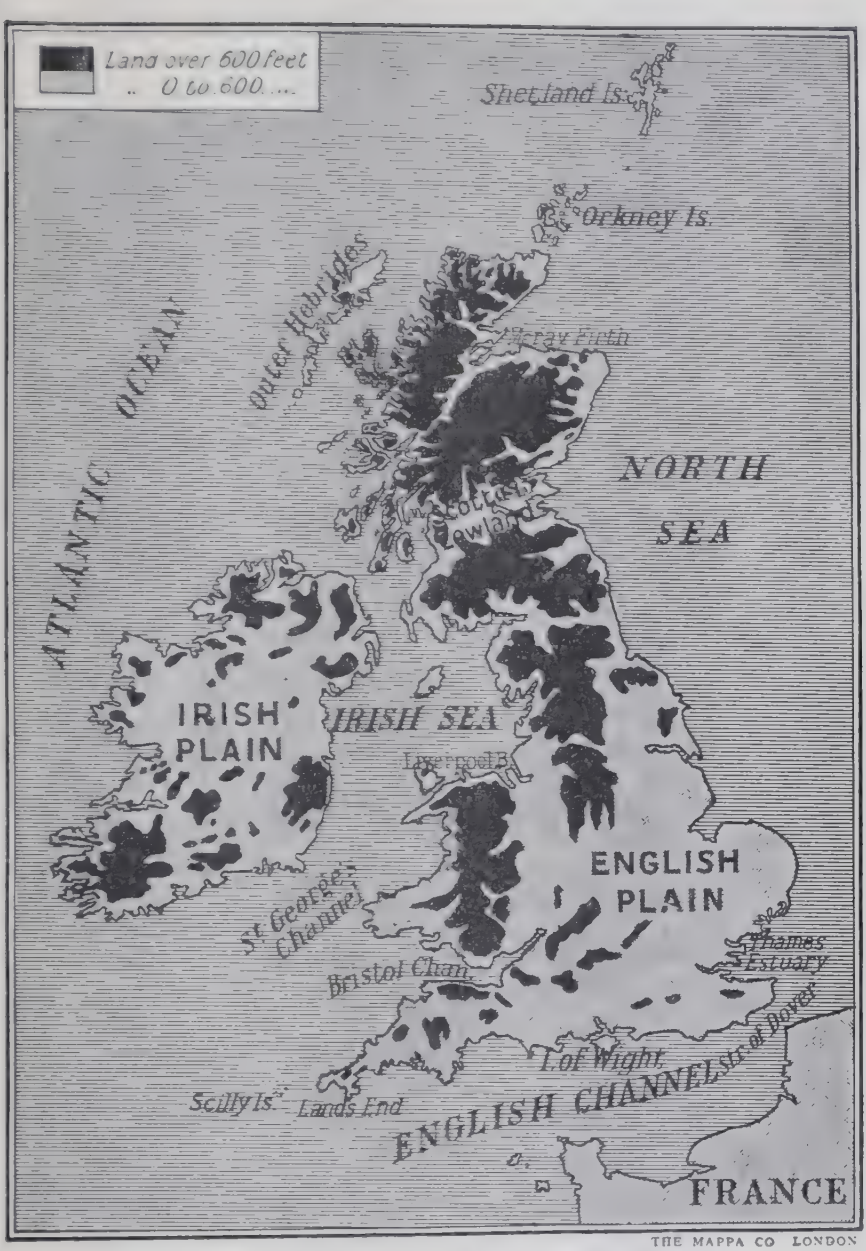

FIG. 4.—THE HIGHLANDS AND LOWLANDS OF BRITAIN.

bases have been formed for the Navy that guards those seas. But though we do our best to keep out enemies, we welcome all which makes for peace and friendliness, trade and prosperity. There is thus much coming and going between Britain and Europe, and regular services of boats cross from port to port. These vessels are like ferries carrying goods and people across the narrow seas which separate England from the mainland. Harwich—The Hook of Holland, Dover—Calais, Folkestone—Boulogne, Newhaven—Dieppe, Southampton—Havre, are pairs of ferry towns on the cross-Channel service.

Long, long ago, before the days of ferry steamers, even before there was a British Navy, important events happened in this country because men could cross the seas and enter the country by its estuaries and rivers. No doubt the earliest people had but frail boats or coracles and only ventured in fine weather when the sea was calm. But in the days of the Romans, and for centuries afterwards, warlike boatmen scoured the seas and often made raids on the British coasts. The comings of the Jutes, Angles, and Saxons, and later the Danes and the Norsemen, are particularly important because, instead of making only raids, they entered the country by means of the rivers and settled as farmers. Dotted over the English Plain arose several small kingdoms which in time became united to form the kingdom of England. Many of the British who lived on the plain before the English came, no doubt remained as serfs or servants, but many fled or moved towards the more difficult country of the west and north, where they found a refuge. Here in the rocky shallow

rivers the English boats were useless, while the wild moorland was not so attractive as the fertile land of the lowland river-valleys. How different would our history have been had the highlands of Britain looked across to the Continent with the lowlands beyond facing the wide, unknown ocean!

A glance at the map will show at once that, though the highlands are mainly in the west, they do not form one vast unbroken plateau that shuts off entirely the south-east lowland from the western seas. Three great breaks are seen which divide the western highlands of Great Britain into four lesser highland regions. In the south-west peninsula of Cornwall and Devon are the low plateaus of Dartmoor and Exmoor. In the west are the mountains and plateaus of Wales; and in the centre of Britain is a group of semi-detached highlands known as the Lake District, the Pennines, the Cheviots, and the Southern Uplands of Scotland. Farther north is the largest region of mountain and moor in Britain—the Highlands of Scotland.

These four divisions of the western and northern highlands are seen on the map to be divided by three inlets of the sea with narrow plains at their heads. These are the Bristol Channel and the plain of the lower Severn; the Liverpool Bay and the Cheshire plain, and the Firth of Clyde and the central lowlands of Scotland.

These breaks in the highlands have been and still are important, for they have formed routes from east to west which in recent times have been used for the making of roads, canals, and railways.

But even these divisions of highlands are not

entirely unbroken. One marked division is that which splits the Highlands into a system of northern and central Scottish plateaus (see Fig. 34). A long line of lakes, of which the greatest are Loch Lochy and Loch Ness, extends from Moray Firth to Loch Linnhe. The long narrow valley which they form is known as Glen More, the Great Glen. This break in the Highlands is not so very important because the area itself is not very important, but the lakes have been joined and the Caledonian Canal makes a waterway through one of the prettiest parts of Scotland.

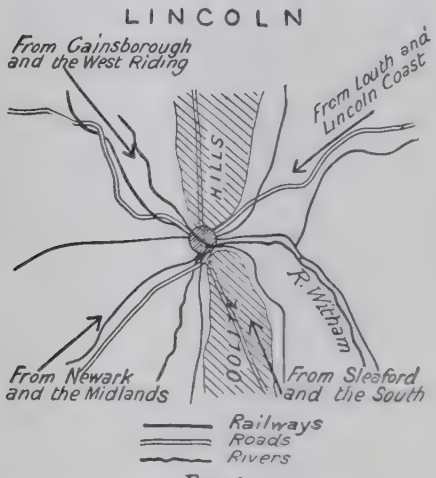

FIG. 5.

This sketch-map shows the position of Lincoln. Describe the site in detail.

In the Southern Uplands, the Pennines, in Wales, and in the lower hills of South-eastern England, various river-valleys lead to "gaps" or "passes" across which roads and railways may be built to join the lowlands which the mountains separate. Those in the Pennines are particularly important, not only because they join the eastern and the western plains, but rather because they join the large industrial regions which have sprung up on the coalfields where the lowlands meet the mountains. The Tyne Gap and Aire Gap, as their names imply, are formed by the rivers Tyne and Aire, one leading to the Eden valley and Carlisle, the other and the more important leading by way of

the Ribble valley to the industrial region of South Lancashire.

If for the moment we look at Scotland only, we see a different distribution of highland and lowland from that which we have studied in the English Plain and its surrounding mountain masses. Two parallel lines from Aberdeen to Dumbarton and from Dunbar to Ayr divide North Britain into three regions. The southern is the Uplands and the northern is the Highlands. Between these two is the Scottish plain which is called the Central Lowlands. The valleys and the firths of the Tay, Forth, and Clyde divide the lowlands into four separate hilly regions, while Edinburgh, Glasgow (or Dumbarton), Stirling, and Perth can be seen from the map to occupy such important positions between the Highlands and the Lowlands that they may well be called the "key" towns of the Lowlands (see Fig. 26).

In Ireland, on the other hand, the mountain masses form a broken ring round the Central Plain. From the great lowland region rivers flow north, south, east, and west, so that the Plain reaches the coast in very many places. Where the Plain spreads out to the coast most of the principal towns of Ireland have grown up (see Fig. 39): Dublin and Drogheda on the Liffey and the Boyne between the Wicklow Hills and the Mourne Mts.; Wexford and Waterford on harbours between the Wicklows and the Knockmealdown and Galtee Mts.; Cork on Cork Harbour between the Galtee Mts. and the Kerry Mts.; Limerick on the Shannon, and Galway between the mountains of Kerry and the mountains of Connemara; Sligo and Ballyshannon between Mayo and Donegal; London-

derry on Lough Foyle and Coleraine on the Bann which drains Lough Neagh between Donegal and the plateau of Antrim, and Belfast on Belfast Lough between Antrim and the Mourne Mts.

Of all these entrances to the Irish Plain those which face Great Britain must be more important than those which face the Atlantic. And as London at the principal entrance of England from the Continent grew to be the English capital, so Edinburgh at the entrance to the Scottish Plain and Dublin at the entrance to the Irish Plain grew to be the capitals of their country. Now, of course, there are two capitals in Ireland, but even so Dublin is the capital of the Southern State and Belfast the capital of the Northern.

The great lowlands of England, Scotland, and Ireland became far more important than the highlands because they formed better farming country. Moreover, the English Plain, being nearer to Europe, became more important than either of the other two, so that London rose to be first the capital of England and later the capital of the United Kingdom of Great Britain and Ireland. Only recently has Ireland separated to form a new Free State.

This union of the British Isles with London is largely because London is the best focus of the routes of the English Plain, and from the English Plain routes diverge to the Scotch and Irish plains (see Fig. 11). East and west of the Pennines run two great northern routes, of which the eastern is the more important. North and south of Wales along the coastal plain are two western routes to the ports of Holyhead and Fishguard, whence boats run across

to Dublin (Kingstown) and Rosslare at the entrances to the Irish Plain north and south of the Wicklows.

Thus when we speak of the British Isles as the home of the British people, we must think not only of the land on which our houses are built, but of the seas which wash our shores and the manner in which the high and low lands are distributed.

SUGGESTIONS FOR PRACTICAL WORK

1. Draw a simple sketch (of the kind shown in Fig. 5) to show the positions of Nottingham, York, Newcastle, and Berwick along the eastern route and Crewe, Lancaster, and Carlisle along the western route.

2. Make a simple sketch of the Midland Gap, and mark as many places as you can in or near it that were fortified or had castles. Why was the Gap so important ?

3. Draw a map of the British Isles such as they would appear if the continental shelf sank 600 ft. What names would you give to the largest of the islands ?

CHAPTER IV

FOOD AND CLIMATE

Food and clothing are two of our great needs. For both of these we depend upon the vegetation either directly for fibres, fruits, and roots of plants or indirectly for the animals which give us meat and milk, hair, wool, and hides. In every country the production of food forms an important occupation, and many people are engaged in the cultivation of crops and the rearing of animals. Natural vegetation depends on soil and elevation, sunshine and rain. Consequently it varies in different parts of the earth. The hot moist regions of the equator have dense tropical forest growth. The greater part of Europe and similar temperate lands, with their abundant rain but changing seasons of summer and winter, formerly had extensive forests of oak, elm, ash, and beech. In the hot deserts of the tropics and the cold deserts of the polar regions few plants will grow, because in the former there is a lack of moisture and in the latter there is a lack of heat.

Long, long ago man depended for food and clothing on the wild fruits and roots or the animals he hunted. Nowadays man cultivates his food and rears domesticated animals, but even so, his plants and animals must be suitable to the soil and climate. In the

tropics he may grow maize and cocoa; in warm lands with ample rain or water-supply he can cultivate rice, tea, and cotton. In higher latitudes both to north and south of the equator, wheat, sheep, and cattle become increasingly important.

The British Isles are situated between the regions of tropical and sub-tropical heat and the regions of north polar cold. We have a warm summer and a cool, and sometimes cold, winter. Even though the sea modifies the climate, the temperature is generally too low in the winter for seeds and plants to grow. Rain we may get always, so that rarely are the crops spoiled for lack of water. The great task, then, of the British farmer is to make his land yield the greatest possible amount in summer so that he can sell some for food and keep some to feed his horses, sheep, and cattle during the winter.

The English Plain is the great food land of the British Isles, though even the moorlands of the north and west give pasture for sheep and cattle. Of course, we do not obtain all our food supplies from the farms and gardens of our own country. Indeed, as we shall learn later, we depend very largely upon the food-products of other countries.

Though we have rain throughout the year, we know there are several months when it is too cold for plants to grow. Usually, therefore, we can raise only one crop of wheat, potatoes, and other food-stuffs in the year, so that springtime becomes the great seed-time and autumn the great harvest. Britain, in this respect, is not so fortunate as the warm regions of the earth, where, if there is a sufficient supply of water, cultivation may proceed throughout

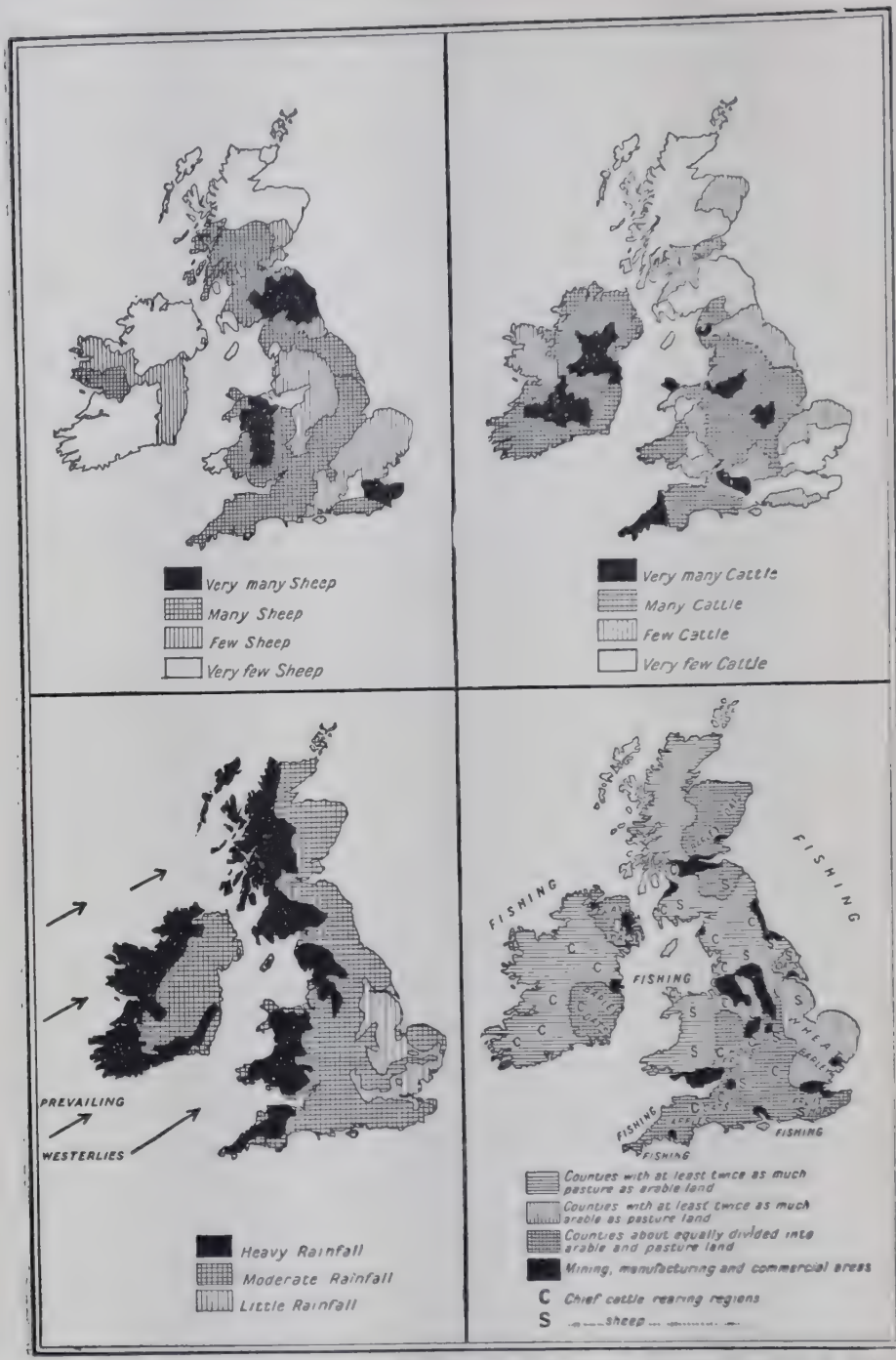

FIG. 6.—THE DISTRIBUTION OF RAINFALL, CATTLE, SHEEP, ARABLE AND PASTURE LAND.

the year. There is even a marked difference between the south of England and the north of Scotland.

The longer summer period of sunlight and the higher altitude of the midday sun combine to give the necessary heat to grow our special food-plants. The shorter winter day and lower midday sun fail to give the necessary warmth for cultivation, and the bare and dreary land awaits the genial days of spring.

We have seen already how fortunate we are to live on an archipelago off the north-west coast of Europe in close touch with the countries across the North Sea and the English Channel, yet separated, and in large measure protected, by the sea. Our climate, too, is influenced by the sea, for lands which border or are surrounded by the sea remain cooler in summer and warmer in winter than otherwise they would be. This effect of the sea is helped considerably, too, by the movement of water in the North Atlantic. Across the ocean, in the direction of the prevailing winds, a " drift " of warm water comes to the shores of western and north-western Europe. This North Atlantic or West Wind Drift surrounds the British Isles, and with the warm south-westerly and westerly winds keeps our harbours free from ice and the winters mild as a rule, except in the extreme northern parts of Britain or on the moors and highlands. Our climate, though sufficiently different in summer and winter to affect our food-crops, is really not extreme. In Russia and Central Canada, within the same latitudes as Britain but far from the sea, there is excessive cold in winter and considerable heat in summer.

The warmest regions of the British Isles in winter

are the south-westerly parts of England and Ireland ; the coldest, the eastern lands of England and Scotland. Bournemouth and Torquay are winter health-resorts, and because the winter is short and mild, early vegetables and spring flowers are obtained from Cornwall and Devon a month or more before they are obtained from the midlands and the north.

The more southerly latitude is not the only advantage of the English Plain. Cornwall and Devon to the south of the Bristol Channel and Wales to the north have much the same latitude, but except in certain sheltered places they are wild moorlands and at best but pasture for sheep, cattle, and ponies. This is due not only to the thin soil, but also to their altitude. Places which are a thousand and more feet high are colder than those whose height is less. Usually, too, the wind sweeps across the moors and mountains, which is a great disadvantage to the cultivation of crops and to the growth of trees.

Rain, though necessary for all crops, may actually be a calamity. When it falls in a great downpour, crops like wheat, barley, and oats may be beaten down or the soil may be washed from the roots of mangolds, turnips, and potatoes. Then, too, fine weather is required to harvest hay and wheat, and a long spell of wet weather at harvest-time would ruin a farmer's work for a year. We may then have too much rain, or we may have it just when we require fine weather to gather in the harvest.

The warm winds which sweep across the Atlantic are our great rain-bearing winds (see Fig. 6). Consequently the western lands are wetter than the east, especially as they are higher and clouds form more

readily upon them. These heavy rains and mists keep the hill-pastures green in summer, but cover the mountains with snow in winter, so that cattle and sheep must be brought down to the sheds and fields of the sheltered valleys.

On the English Plain, the west is wetter than the east and fine days are less frequent, especially during August and September, when barley, oats, and wheat must be harvested. The great wheat-lands are therefore in the warm south and east, the wetter western plain being given over to the growing of root crops and the keeping of cattle. Hence Cheshire, Hereford, Somerset, and Devon are famous for their dairy cows, cream, and cheese.

Of course, you must not think that *all* the sheep are reared and *all* the wheat is grown in the eastern counties, or that *all* the dairying is done in the west. Mixed farming, as it is called, is carried on throughout the English Plain and on the lowlands farther north. But the hilly lands of limestone and chalk are especially the sheep-lands, and the vales and the west the cattle-lands, while the east and south, with their greater sunshine and drier weather during late summer and autumn, are especially suitable for wheat.

Ireland, like Cheshire and Hereford and Western England, has abundant rain, and is called in consequence "The Emerald Isle." It has lands suitable for cattle and horses rather than sheep, and for the cultivation of potatoes and turnips (and, therefore, the keeping of pigs) rather than wheat.

As we go farther north the summer becomes shorter and it is more difficult to grow wheat. Only along the plain between the Firth of Forth and the

Pentland Hills is much wheat grown, though oats and barley will grow in the valleys and plains as far north as Inverness. Indeed, while wheat and bread have been the food of the people of England for centuries, we often think of Scotland as the land of porridge (made from oats) and oat-cakes.

Though fruit trees grow almost everywhere in Britain—at any rate south of the Scottish Highlands —soil, sunshine, and rain make certain regions more valuable than others. Some are really fruit-lands growing small fruit like strawberries, gooseberries, and currants as well as apples, pears, and plums. In England Hereford, Worcester, and Devon in the west, Kent and Middlesex in the east, are specially important, while in Scotland the vale of Clyde grows much fruit, though strawberries are gathered in August while they are ripe in June in Hampshire. We have already learned that specially equipped fast trains are employed to carry fish from the ports to the populous centres ; similar arrangements have to be made for the fruit trade, for fruit, like fish, is perishable, and must be dealt with quickly.

Life on a farm in rural England is very different from life in a town. The farm with its sheds and stacks probably stands in the midst of fields across which can be seen the whitewashed buildings and orchards of surrounding farms. Nearby may be a row of small houses, the homes of the labourers, hardy sons of the soil who, by looking after the cattle or by ploughing the land and harvesting the corn, are providing the food which people in the town require.

The village, nestling among the trees near some stream or at the crossing of two main roads, forms the

centre of these scattered farms. Here are the church, the school, and the public-house. The smithy is kept busy with the shoeing of horses and the mending of ploughs, harrows, and other agricultural machinery (see Fig. 7). There are a few shops,

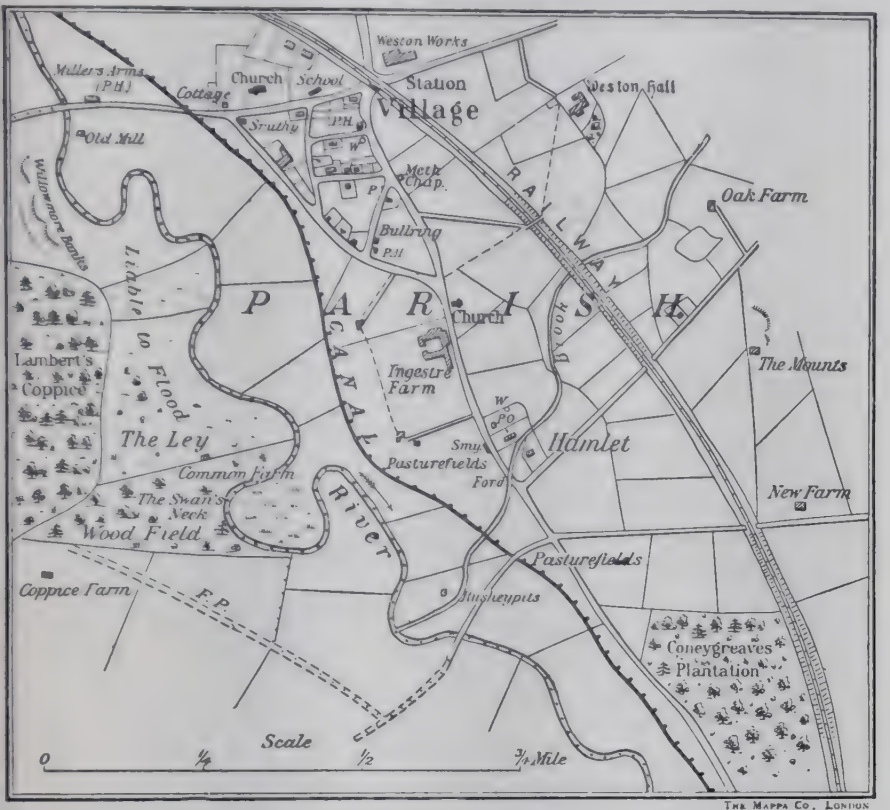

FIG. 7.—MAP OF AN ENGLISH VILLAGE.
"Read" its various features.

perhaps, though these are really not important. The post-office and the railway station are links with the outside world, and with the "town" to which the farmer goes once or twice a week and the labourer possibly only on fair-days and holidays. The

Photo by Central Aerophoto Co., Ld.

FIG. 8.—AIR PHOTO OF CHESHAM BOIS.

A new kind of village—residences of city workers who wish to live out in the country. Could you write an essay on

" town " is the real centre of rural England. The country lanes from the farms lead to the village and the roads from the villages lead to the main roads which lead to the town (see Fig. 9). Every now and again along the roads may be seen cattle and

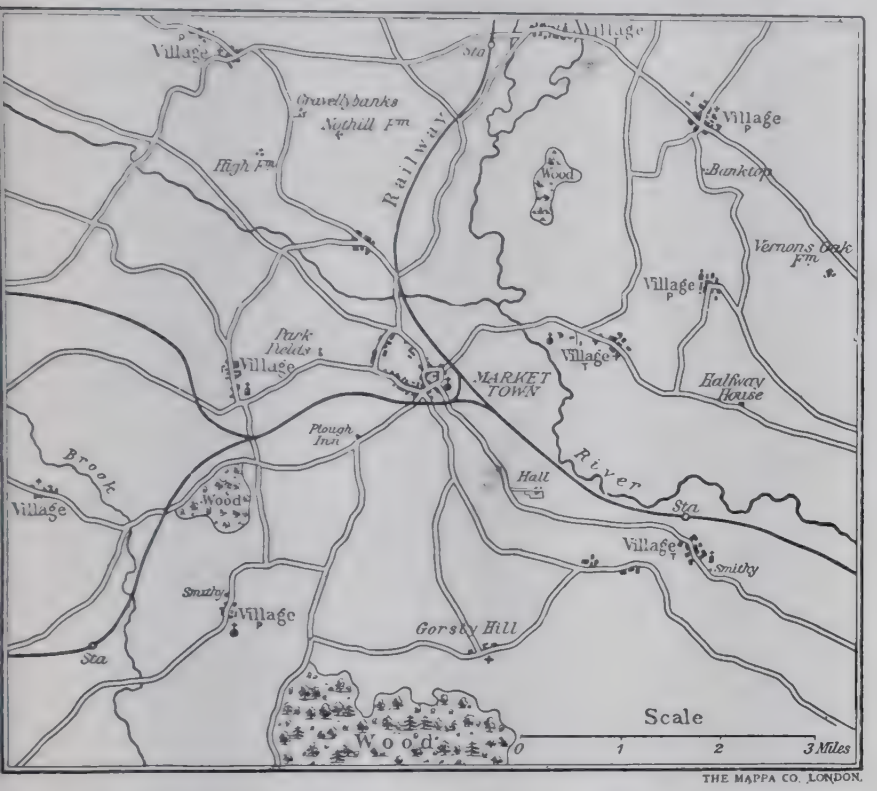

FIG. 9.—MAP OF AN ENGLISH MARKET TOWN AND ITS NEIGHBOURING VILLAGES.

Notice how the roads and the railways converge upon the town.

sheep, waggons and farmers' carts, going to " market." There, in the town, the farmer sells his produce and buys such things as he needs for himself and his farm—provisions, clothes, saddlery, and farm implements. Here are the big shops, the inns with large

Photo by Central Aerophoto Co., Ld.

FIG. 10.—WARWICK FROM THE AIR.

The city is the market centre of a number of agricultural villages, one of which is seen on the picture. Notice the

yards for the farmers' carts, and banks and lawyers' offices to do the farmers' business. Often, too, there are flour-mills where the corn is ground, breweries where the barley and hops are made into beer, butter and cheese factories, and iron-works for the making of agricultural implements. The railway station is large, with ample sidings for dealing with the coal and goods brought to the town, and the cattle and food which are sent to other places.

These are the market towns which, dotted about the English Plain and other agricultural lands, draw together the scattered villages and farms of rural England.

SUGGESTIONS FOR PRACTICAL WORK

1. In connection with your study of the climate of the British Isles, make observations throughout the year of such phenomena as :

(*a*) The path of the sun across the sky.
(*b*) The height of the midday sun.
(*c*) The temperature of the air.
(*d*) The direction of the wind.
(*e*) The amount of the daily rainfall.
(*f*) The character of the weather (including notes on sunshine, cloudiness, fog, etc.).
(*g*) The work of the farmer.
(*h*) The appearance of trees and other facts of Nature.

Wherever possible represent your observations in a graphical manner. You should also be very careful to study the inter-relations between the various facts you observe (e.g. the relation between the height of the sun and the temperature or between the prevailing wind and the rainfall). Simple home-made instruments are quite satisfactory for most of the observations.

2. Make several large tracings of the British Isles and insert the county boundaries on each. Choosing a suitable scale, shade very carefully the various counties so as to make one map show the distribution of cattle and sheep, another the distribution of wheat growing, another the distribution of arable land, and another the distribution of pastoral land. The statistics for the purpose should be extracted from such sources as the Annual Agricultural returns, "Statesman's Year-Book," etc. Written descriptions of each map should be prepared.

3. Using as headings "home products" and "foreign products," tabulate lists of articles normally consumed at (*a*) breakfast, (*b*) dinner, (*c*) tea.

4. What is meant by "rotation of crops"? Give examples. If you live in the country, you should give actual examples, and, if possible, illustrate your answers by sketch-maps of some large farm.

5. On an outline map of the British Isles shade the land over 600 feet in elevation. Then shade those parts which have an average annual rainfall of over 60 inches, and those receiving between 30 and 60 inches: mark the prevailing winds, and then write an account of the facts which are made clear by bringing together relief and rainfall on the same map.

6. On an outline map of the British Isles shade those parts which (*a*) are warmest in summer, (*b*) are coldest in winter, (*c*) have the best range of temperature throughout the year. Account for this distribution of temperature.

CHAPTER V

THE PLAIN OF ENGLAND

We have learned that eastwards of Cornwall and Wales and southwards of the Peak lies the largest plain within the British Isles. In few instances does the land rise above fairly hilly country, and generally it is so low, especially in the east, that much of it round the Wash and the estuary of the Thames is little more than marsh. This is the English Plain, which occupies the greater part of England and was the most important part of the country until the days when coal became the basis of our industry.

This English Plain, though low compared with Wales and Scotland, is not by any means level and uniform. Across it may be seen belts of very hilly country, with rivers occupying the lowland vales between.

Immediately east of Wales are the valleys of the Rivers Dee and Severn, but farther still to the east is the higher land that really forms the centre of England. It lies within the triangle made by the Rivers Trent, Severn, and Avon, and is sometimes called the Midland Plateau. This was once well forested, and though much of the forest has now been cleared for farms, it still has a wooded appearance, and old names remain, like Charnwood Forest,

FIG. 11.—MAP OF THE ENGLISH LOWLANDS.

Forest of Arden, and Cannock Chase, to remind us of its former character.

This low Midland Plateau forms the north-west

FIG. 12.—STRUCTURAL MAP OF THE ENGLISH LOWLANDS.

corner of the English Plain. The valleys of the Soar, Trent, and Avon give it a triangular shape and separate it from the Pennines to the north and the

Welsh mountains on the west. Consequently the valleys of the Trent and Severn become important routes leading from the English Plain through the Midland Gap to the North Wales coast and to Northern England west of the Pennines.

Elsewhere within the plain there is some order in the way the hills and vales are placed. From south-west to north-east there stretches a line of hilly country of which the highest parts are named the Cotswold Hills, Northampton Uplands, Lincoln Edge, the Yorkshire Moors, and Cleveland Hills. In the south and north this area of limestone is very broad, but in Lincolnshire the hilly country is only some five or six miles across. This line of hills has steep faces to the west and along the foot of the "escarpment," as the face is called, a series of rivers flows—the lower Severn, and its tributary the Avon, the Soar (which is a tributary of the Trent), the lower Trent, and the Yorkshire Ouse.

The particular limestone of which these hills are built consists of tiny grains closely packed and cemented together by Nature. It has been likened to the mass of tiny eggs which form the roe of a fish and because of this has been called "oolite," a word which means "stone-eggs." This close-grained stone is very valuable for building purposes. In Bath and district it is used in place of brick even for ordinary dwelling-houses. Much is also sent to other towns for such special purposes as window-sills, stone frontages for shops and public buildings, and for ornamental stone work. In the Isle of Portland stone of a similar kind is quarried by convicts.

From these limestone hills, often too dry for

ordinary farming, but excellent for sheep, the land slopes gently eastwards until across the country is seen the western-facing scarp of another line of hills. In many places quarries have been made in the

Photo by Central Aerophoto Co., Ld.

FIG. 13.—SALISBURY PLAIN, FROM THE AIR.

Note the character of this chalk plateau. Why do you think the ancient stone circle of Stonehenge is located here?

hillsides and the rocks stand out white and dazzling in the sun. These hills are made of chalk. From Salisbury Plain, really a low plateau across which one can look over rolling grassy country, the hills stretch away north-eastwards in the Chilterns and East Anglian Heights. Here the chalk ridge curves

almost at right angles to form the Norfolk Edge, the Lincoln Wolds, and Yorkshire Wolds. But as you see on Fig. 12, the chalk hills are not continuous, for in two places—The Wash and Humber—the sea breaks through to reach the vale behind.

This vale lying between the chalk and the oolite limestone country is a belt of fertile clay or clayey soil. On it are situated very many of the towns which grew up in England when agriculture was far more important than manufacturing. These old-world towns have buildings which remind us of their age—the colleges of Oxford and Cambridge, the cathedrals of Ely, Peterborough, and Lincoln, with many an abbey and castle which show how men of old valued the fertile vale within the hills. The land is still cultivated, but larger and more modern towns have grown up on the coalfields. These beautiful old towns, which once formed the centres of the life of England, are now but market centres, large though some of them are, except such places as Oxford and Cambridge, which have retained their importance, not only as market centres, but also as university towns.

Land near the rivers of the Central Vale is liable to flood. Indeed, Fenland was once a vast marsh incapable of cultivation until drained by dykes and ditches. It formed a land of refuge in the east, as did the mountains of Wales in the west. The Isle of Ely, a small area of comparatively high, dry land surrounded with reed- and rush-covered marshes, will always be remembered on account of the exploits of Hereward the Wake and his gallant band, for they held out against William the Norman long after other parts of the country had surrendered.

Along the banks of the rivers of Central England water-meadows form rich pasture for dairy cows, while the grassy hills form pasture for sheep. Between the meadows and the hill-pastures, the land is well suited for "mixed" farming, that is, the farmer can both plough the land for wheat, turnips, and other crops, and on the grasslands keep his sheep and cattle.

West of the oolitic hills the land drains south-westwards to the Bristol Channel, and north-eastwards to the Humber, which really forms a gap through both oolite and chalk hills. The Clay Vale itself may be divided into two, a southern basin, the Upper Thames Basin with Oxford as its centre, and a northern region which drains through Fenland to the Wash. In both these regions the rivers, in order to reach the sea, must pass the line of chalk hills. The Wash is the northern gap, and the rivers enter the sea directly. The southern, or Goring Gap as it is sometimes called, is smaller, and the Thames, after flowing between the Marlborough Downs and Chiltern Hills, has to flow across the London Basin before reaching the sea in the estuary of the Thames. This is because the land south-eastwards of the chalk continues to slope gently to the valley of the lower Thames, where, we have seen, London has grown up on one of the principal entrances into the British Isles from Europe.

Immediately south of the Thames the land rises to the chalk country of the Downs. If we return to Salisbury Plain we shall find that not only does the hilly country extend north-eastwards to the Chilterns, but eastwards also to the Downs of Hamp-

shire. There the high land divides and part runs eastwards to form the North Downs and part runs south-eastwards to form the South Downs. Between these chalk ridges with their " in-facing " scarps is a hilly sandstone country called the Wealden or Forest Ridges. The Forest Ridges are separated from the Downs by two small lowland valleys called the Vale of Kent and the Vale of Sussex. The land within the Downs is the Weald, a word, like wold, which means " wood " and refers to the forests which once covered the vales and lower hill-slopes of this as well as other regions of the English Plain.

South of Salisbury Plain and partially enclosed by the South and Western Downs is another lowland area called the Wessex or Hampshire Basin. This in many ways can be compared with the London Basin, both in soil and history. In a previous chapter we noticed how important in defence the Narrow Seas have been, and how a line of naval bases has been built round the south-east coasts. Now we see that all these coasts are not equally important. Where the Straits of Dover cut through the Weald and the Chalk Downs, bold cliffs stand out against the sea, as South Foreland and Beachy Head (see Fig. 1). Indeed, the whole of south-east England may be looked upon as a large headland separating the great entrances of the Thames Estuary and Southampton Water. At the head of these two waterways stand the ports of London and Southampton. It is not surprising, therefore, that the two principal naval dockyards guard these estuaries and ports, Chatham for the Thames and London, Portsmouth for Southampton.

The English Plain, backed by the mountains of the north and west, and open to the Narrow Seas and the continent of Europe, is even now the basis of our English life. For though on the outskirts, where coal and iron are found, large towns have grown, the English Plain is still the chief home supply of food and London is still the mighty heart of Britain.

We now have learned that differences in relief, soil, and climate enable us to divide the English Plain into a number of regions, each with its special geographical phenomena (see Figs. 11 and 12). Between the Pennines and the limestone hills lies the Vale of Trent draining to the Humber and containing the market towns of Nottingham, Newark, and Gainsborough. Farther to the south, enclosed within the hills of limestone and chalk and drained to the Wash by the Rivers Witham, Welland, Nen, and Great Ouse, is Fenland, now largely drained and cultivated. Old market towns, as Lincoln, Peterborough, Bedford, Huntingdon, Cambridge, and King's Lynn, stand on the edge of Fenland, while a few, as Ely, Wisbech, and Boston, stand on high land within Fenland itself. Fortunately, this is one of the regions with least rainfall in the British Isles, otherwise even with the wide drainage ditches it would be difficult to get the water away. As it is, the low-lying land is often waterlogged, and is more suitable in many places for roots —potatoes, turnips, mangolds, etc.—than for wheat. Here, as in Ireland, where root crops also are largely grown, pigs are kept, and this is one of the important regions in England for the supply of hams and bacon.

Beyond the chalk hills of the Norfolk Edge is

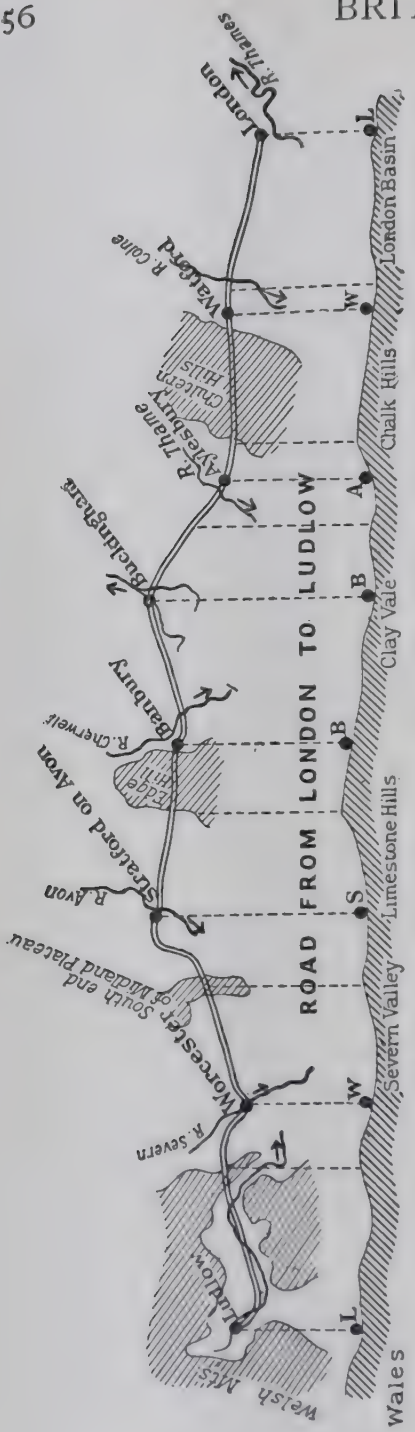

Fig. 14.—ROAD AND SECTION MAP FROM LUDLOW TO LONDON.

East Anglia—the counties of Norfolk and Suffolk, and part of Essex—with Norwich and Ipswich as the great market and business centres. These three regions, the Vale of Trent, Fenland, and East Anglia, form an eastern plain in which corn, turnips, and potatoes are grown. There are rich meadows along the rivers for hay and cattle, and pasture for sheep on the surrounding hill-country.

In the south-east are the two basins of the Lower Thames (London Basin) and Wessex (or Hampshire), separated by the hilly and once-wooded country of the Weald. These with their drier climate and much sunshine are specially suited for corn and fruit, though the great need of London for

milk often results in land being used for dairy cows which might otherwise be ploughed for roots or corn. On the hills—or downs as they are usually called—sheep are reared, giving wool for clothing and mutton for food. Of the market towns, Ipswich, Colchester, Chelmsford, and Hertford are in the London Basin; Winchester and Salisbury in the Wessex Basin; Maidstone, Guildford, and Lewes on the edge of the Weald. Greater London, with nearly eight million people, is so large that it dominates the whole area and makes all other places within thirty or forty miles seem small.

In the west, the Cheshire Plain, the Severn Plain, and the Plain of Somerset form a western plain divided from the eastern plain by the Pennines, the Midland Plateau, and the limestone hills of the Cotswolds and Northampton Uplands.

The Cheshire Plain, drained by the Mersey and the Dee to the Bay of Liverpool, has as its market centre the fine old town of Chester. We shall learn later that the presence of salt and coal gives to some parts of this agricultural plain new industries, such as the manufacture of chemicals and cottons. Farther south, the Wye and the Severn, with its tributary the Avon, drain one of the richest agricultural regions of the British Isles. The rich grass forms excellent food for cattle, and fruit grows on the fertile soil of Worcestershire and Herefordshire. Warwick, Worcester, Hereford, and Gloucester are market towns, and the presence of old castles, cathedrals, and abbeys in this region shows how it was valued by the monks and nobles in the Middle Ages.

Most of the pleasure-grounds of Britain are in the mountainous north and west or along special parts of the coast. Here, however, in the west are many

inland pleasure-resorts, Malvern, Leamington, Cheltenham, and Bath, due partly to the beautiful woodland and hilly scenery and partly to medicinal springs which are valued for their health-giving properties.

The small plain of Somerset, surrounded by the Mendip Hills, the Western Downs, and the Quantock Hills, is a rich cattle country, with Taunton, Yeovil, and Wells as its principal market centres.

A hundred years ago men made canals to join these various regions into which we have divided the English Plain. The rivers and their tributaries made it easy to join the parts together. These canals to-day are mostly choked with weeds, and only one or two of the most important are now in use at all (see Fig. 15).

Just when canals were being made to link up the agricultural regions, men learned the use of coal, and in northern England and South Wales new industries arose on the coalfields. Instead of joining the various parts of the English Plain, the aim now was to connect the coalfields with the capital, London, which had grown to be the great port opposite Europe. Our main railway lines thus radiate from London across the English Plain to reach the north and west. Only one main line crosses the plain from north-east to south-west. This is the Midland main western line, which connects the coalfields from Leeds and Sheffield through Derby and Birmingham to Bristol.

Upon the English Plain a new type of town has thus grown up, namely, the large railway centres where waggons, carriages, and locomotives are made. Derby, Crewe, Stafford, Swindon, and Eastleigh are but a few of the industrial towns which have grown up *off* the coalfields because of their railway works.

CHIEF ENGLISH CANALS NOW IN USE

Reproduced from "Economic Geography in the British Empire" by C. B. Thurston.

FIG. 15.

To-day motor-cars and lorries form another important means of transport, and along the roads

leading out from London may be seen gangs of men widening and strengthening the roads in order that they may carry the ever-increasing motor traffic which passes between London, the English Plain, and the industrial regions of the North.

Think, then, of the English Plain, with its many smaller divisions, as England's great food-land. In the south-east, on the estuary of the Thames, stands London, looking across to Europe and the delta of the Rhine. North and west are industrial coalfields. Thus from the port of London roads and railways cross the English Plain spoke-wise from the hub of London to a rim of manufacturing towns as Birmingham, Liverpool, Manchester, Bradford, Leeds, Sheffield, and Newcastle.

SUGGESTIONS FOR PRACTICAL WORK

1. Draw a sketch similar to Fig. 14 showing a holiday cycle-ride from London to Brighton. Where would you expect to find the road hilly and where almost level? What places would you wish to go through, and how long would you take if you did about 20 miles each day? Where would you stay each night?

2. Make a sketch similar to Fig. 5, to show the site of Chester or Reading.

3. On an outline map of England plot all the places you know which have an old cathedral or abbey, and compare with Figs. 11 and 12.

4. Divide an outline map of the English Plain into regions, marking in each one the principal towns. Choose one region and give all the reasons you can why we think of it as a special region.

5. In which parts of the English Plain would you expect to find each of the following industries extensively carried on: sheep rearing, cattle rearing, wheat growing, fruit growing?

R. B. A. K. M'S EDUCATIONAL COMMITTEE
No.....
Date.....
BANGALORE.

CHAPTER VI

SOUTH-WEST ENGLAND

South-west England, consisting principally of the two counties of Devon and Cornwall, forms a great promontory jutting into the Atlantic Ocean. In some respects it may be compared with the south-east projection of Kent and Sussex, but there are many important differences. Opposite the cliffs of Dover, and visible on a clear day, stand the cliffs of Calais. Though the Strait of Dover may at times be rough, there were very many occasions when boats could cross with ease these Narrow Seas, as they are sometimes called. In olden times when boats were small a ring of important ports extended round the Kentish and Sussex coasts. The Cinque Ports, as five of these were called, had a great amount of traffic with the Continent. Now, partly because of the increase in the size of ships, and partly because the harbours have partially or wholly silted up, the sea-borne traffic passes to London and the North Sea ports or westwards down the Channel. The naval port of Dover stands where two seaways meet, and therefore is particularly important.

No such continent faces south-west England. True, some 3,000 miles across the Atlantic lies the continent of America, but a visitor looking out from

the cliffs of Cornwall would see only the mighty ocean and think Land's End well named. Day and night unceasingly the waves beat upon the cliffs, often lashing themselves into fury and casting sea-spray high into the air. Along this dangerous coast many a vessel has met its doom, and the waves have tossed the wreckage on the shore.

Byron has described the ceaseless movement of the ocean and how man, great as are his powers, fails to curb the fury of the sea.

"Roll on, thou deep and dark blue Ocean—roll!
Ten thousand fleets sweep over thee in vain;
Man marks the earth with ruin—his control
Stops with the shore;—upon the watery plain
The wrecks are all thy deed, nor doth remain
A shadow of man's ravage, save his own,
When for a moment, like a drop of rain,
He sinks into thy depths, with bubbling groan,
Without a grave, unknelled, uncoffined and unknown.

"His steps are not upon thy paths—thy fields
Are not a spoil for him—thou dost arise
And shake him from thee; the vile strength he wields
For earth's destruction thou dost all despise,
Spurning him from thy bosom to the skies,
And sendest him, shivering in thy playful spray
And howling, to his gods, where haply lies
His petty hope in some near port or bay
And dashest him again to earth;—there let him lay."

What shall we say then of the brave men who, in spite of all these dangers, do make their way upon the ocean path and from the watery field take their spoil of fish?

These seas abound with pilchard, mackerel, and other fish, especially at certain seasons. Long before men dared to cross the full 3,000 miles of the Atlantic,

they ventured out to sea from the villages that extend all round the coasts in order to obtain supplies of fish. The harvest of the sea was more important than the harvest of the field, for much of the interior

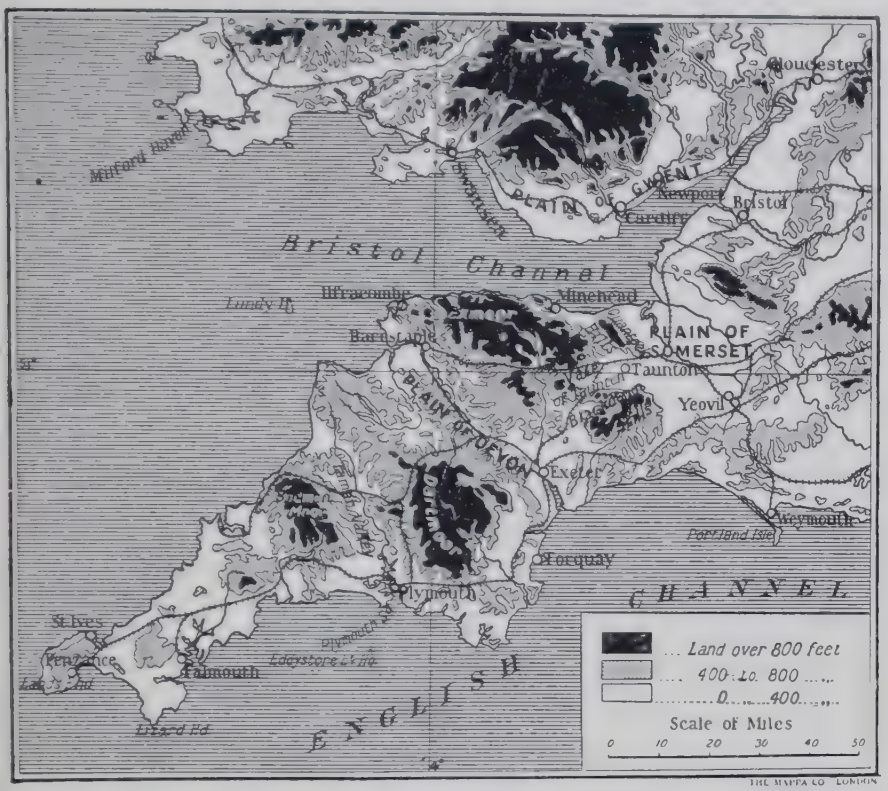

FIG. 16.—MAP OF SOUTH-WEST ENGLAND.

consists of poor and dreary moorland of little use to man.

In the eastern plain we noticed how the principal towns grew up as market centres for the villages and rural districts. In south-west England the principal towns grew up at the mouths of the rivers, where the small and somewhat sheltered valleys opened to the

sea. Falmouth, Plymouth, and Dartmouth show this in their names, but there are others, such as Exeter and Barnstaple.

Britain is justly proud of this hardy race of seamen from Devon and Cornwall. The great ocean voyages at the end of the fifteenth century—when Columbus and Cabot sailed across the Atlantic, one to the West Indies and the other to the St. Lawrence, and when Vasco da Gama rounded the Cape of Good Hope and found a seaway to India and the East—opened a new epoch for the men of Devon. The Atlantic, instead of being a dreaded barrier, became to adventurous men a way to lands rich in gold and silver, silks and spices. Land's End lost its meaning except as applied to England, and Plymouth became the starting-place for many an expedition, either for peace or war, which helped to lay the foundation of our Empire.

Drake sailed round the world, Raleigh endeavoured to found a colony on the eastern coast of America, while the names of Hawkins, Drake, Grenville, and Raleigh will always be remembered for the part they played in the struggles with Spain in the period of the Armada.

Perhaps the most remarkable expedition which started off from Plymouth was that of the Pilgrim Fathers, who went to found a New Plymouth and a New England away beyond the Atlantic. The south-west peninsula became a jumping-off ground for the new and larger world which the daring sailors of many countries had discovered.

To-day, thousands of ships traverse the oceans from port to port, and many head their way from

foreign ports towards this south-west England. Then as they approach, they must choose one of the two ways which the projection marks out. Either they must proceed up the English Channel on the way to the North Sea, or they must sail northwards for the Bristol Channel and the Irish Sea. Off Land's End, the seaways approaching Britain meet and then divide, some proceeding to our eastern ports, some to our western ports. In this important region stands the naval yard of Plymouth, as Dover guards the east.

In Cornwall and Devon, as we have seen, fishing was once more important than farming. This perhaps is not now the case, for times have changed and things which once had no use are now extremely valuable.

As we leave the English Plain and pass westwards beyond the Plain of Somerset, the land rises to the wild, bleak moorlands composed of granite and other igneous rocks. The rocks of the English Plain are known as sedimentary rocks. Though now above sea-level, originally they were deposited as sediments from rivers and running water existing in those times. Igneous rocks, on the other hand, come from within the interior of the earth, often in molten form. In Cornwall and Devon, as in many other places, the rocks which form the earth-crust have been greatly compressed and fractured. Some of the cracks or fissures come through to the surface, while others do not. Thus occasionally rock flows as lava on the surface of the earth, whilst sometimes it cools slowly into an extremely hard rock in the crustal rocks themselves. This kind of rock we call

granite. At first, as we have seen, it is formed below the surface. But in the course of an exceedingly long, almost immeasurable time, frost and rain remove the upper rocks and the granite is exposed, as at Exmoor, Dartmoor, Bodmin Moor, and other smaller moors. Often, too, there are found in many of the fissures useful metals, as copper, tin, and lead. These "veins," as some of the "intrusive" rocks are called, are in places specially rich, and for centuries have been mined for their copper and tin. We even think that the tin of Britain found its way to the Mediterranean in the days of King Solomon, a thousand years before the birth of Christ; and though the Cornish mines are not now very profitable, some are still in use and produce a little metal, whilst Cornish miners are found in all parts of the world.

When, nearly a century and a half ago, coal was first used extensively in the smelting of iron and other metals, copper and tin from Cornwall were sent to the coalfield of South Wales. There the industry of making copper goods and "tins"—that is, coating iron with a very, very fine covering of tin—grew up, becoming so large that to-day the tin and copper required must be obtained from other parts of the world.

Even the surface rocks can now be put to use. The hard and durable granite makes excellent material for constructing our main roads, which must be built strong enough to carry the heavy loads that motor-lorries now transport. But among the granite masses are many places where the rock is soft and clayey. This clay, when pure and fine, is specially important. It is called china-clay or

kaolin, and from it cups and saucers and other pottery can be made so fine and transparent that they are extremely valuable. Each year tons of kaolin are sent from Fowey to Staffordshire and elsewhere to be made into "china."

The moorland areas, often drenched with the mists and drizzle that come with the south-westerly winds from the ocean, are too poor in soil and often too bleak to be of much use for farming. In some of the wilder parts not a house is to be seen, and a stranger might easily lose his path across the heather-covered moors, or find himself in difficulties among the bogs which form so great a danger in very many parts. Amid such bleak and damp surroundings few animals can be kept, but some small, hardy ponies are reared and find a ready sale for haulage purposes in the coalpits. Fortunately, however, fewer ponies are now engaged in this underground work, owing to the adoption of other means of transporting the coal from the workings to the bottom of the shaft.

Cattle and sheep are reared, and here and there in places where there is a sufficient depth of soil a few fields are cultivated for oats or wheat. Even here, however, the damp often prevents harvesting, and the corn is cut green as fodder for the cattle. These wild moors are among the few places in Britain still in a natural state. The red deer roams free, except when he is used as sport for the huntsman, and everywhere the lover of Nature finds plants and animals which he would seldom come across in other parts of England.

Where the rivers have brought down the silt and rocks from the moorland to give good soil in the

valleys, the land is much more fertile. The abundant moisture and the mild winters produce a rich green, making the lanes and river-valleys some of the prettiest in England. Indeed, in the south-facing valleys, which receive much greater influence from the sun, the vegetation reminds one of the palms and other trees that grow in the south of France.

Thus we can see why, except in the larger river-valleys, the principal towns and villages grew up near the sea and many of the inhabitants took up fishing for a living instead of cattle rearing or farming.

But times are changing for Cornwall and Devon. The mines are almost worked out. The fishing is not so important now that large fleets fish the Dogger Bank, or sail north to the Arctic waters or west to the Newfoundland Banks, and now, too, that we can obtain meat from so many other parts of the world. Even the fishermen, good sailors as they are, are not so indispensable in these days when merchantmen and men-of-war are really like vast machines and require engineers to look after them.

Instead of the things that made the south-west peninsula so important in the past, it has to offer other attractions to-day. London to the east and South Wales to the north have very large populations which require both food and holidays. The mild winter and long summer enable early vegetables and flowers to be grown in the Scilly Isles and other special and sheltered places, while the sea and craggy sea-cliffs, the deep wooded glens and bare open moorlands, attract in the summer seasons thousands of visitors. Minehead and Ilfracombe in North Devon, Newquay and St. Ives in Cornwall, Torquay and Lyme

Regis in the south, are but a few of the pleasure-resorts to be found in these glorious western counties.

One stern exception to this ring of pleasure-places is the naval port of Devonport and Plymouth, with Eddystone Lighthouse off the Sound. The English Channel is the principal seaway to our southern and eastern ports and especially to London. Plymouth thus stands at the western entrance, as Dover stands at the eastern. In this respect Plymouth has not altered from the days when Drake set out to meet the Armada to the days in which we live. Otherwise the stirring times when "men of Bideford in Devon" and other western ports sailed the Spanish Main or "singed the beard of the King of Spain" have passed and gone. To-day the bleak moorlands of the interior are fringed with fertile plains utilised for vegetables, fruits, and dairy produce, and cater for visitors from the more industrial and less lovely regions.

SUGGESTIONS FOR PRACTICAL WORK

1. Plan a holiday of four weeks in south-west England and show on a map the route you would follow, using different kinds of lines to indicate the parts traversed by walking, coaching, or railway. Add a note stating where you would stay each night and what you would expect to see on your tour.

2. Many boats merely call at Plymouth to land mails and passengers and then proceed to Liverpool. What routes would three passengers take whose respective destinations were (1) London, (2) Birmingham, and (3) Swansea? How many miles would each travel?

3. From a week's Shipping Movements (taken from a newspaper) plot the positions and courses of those vessels within 500 miles of the British coasts. Notice the two streams of shipping separated by south-west England.

CHAPTER VII

WALES

The fertile plains of the lower Dee and Severn form a division between the hilly country of the English Plain to the east and the plateaus and mountains of Wales to the west. Though in the distance the latter appear like a massive wall, a number of valleys like those of the Wye, Teme, Severn, and Dee lead into the heart of Wales and form lines of communication between the plain and plateau. An aeroplane flight would show a scene, when not blotted out by mist or rain, like the waves on a stormy sea, with mountain crests for billows and sharply cut valleys for troughs between the waves. Now and again a larger valley would appear dividing mass from mass, and occasionally, too, our aeroplane would need to rise still higher to overtop the highest peaks (see Fig. 3).

Wales is a land of mountainous moorland, much of which is suitable for pasture, especially in summer. But everywhere are river-valleys of greater or lesser size where farms are built and where the villages and towns have grown. These valleys, we have seen, widen out to the English Plain, and many important towns, once guarded by their castles, but now important for their markets and railway junctions, extend from north to south. Such are Chester,

Shrewsbury, Hereford, and Newport, all in English counties, and Llangollen, Welshpool, Builth, and

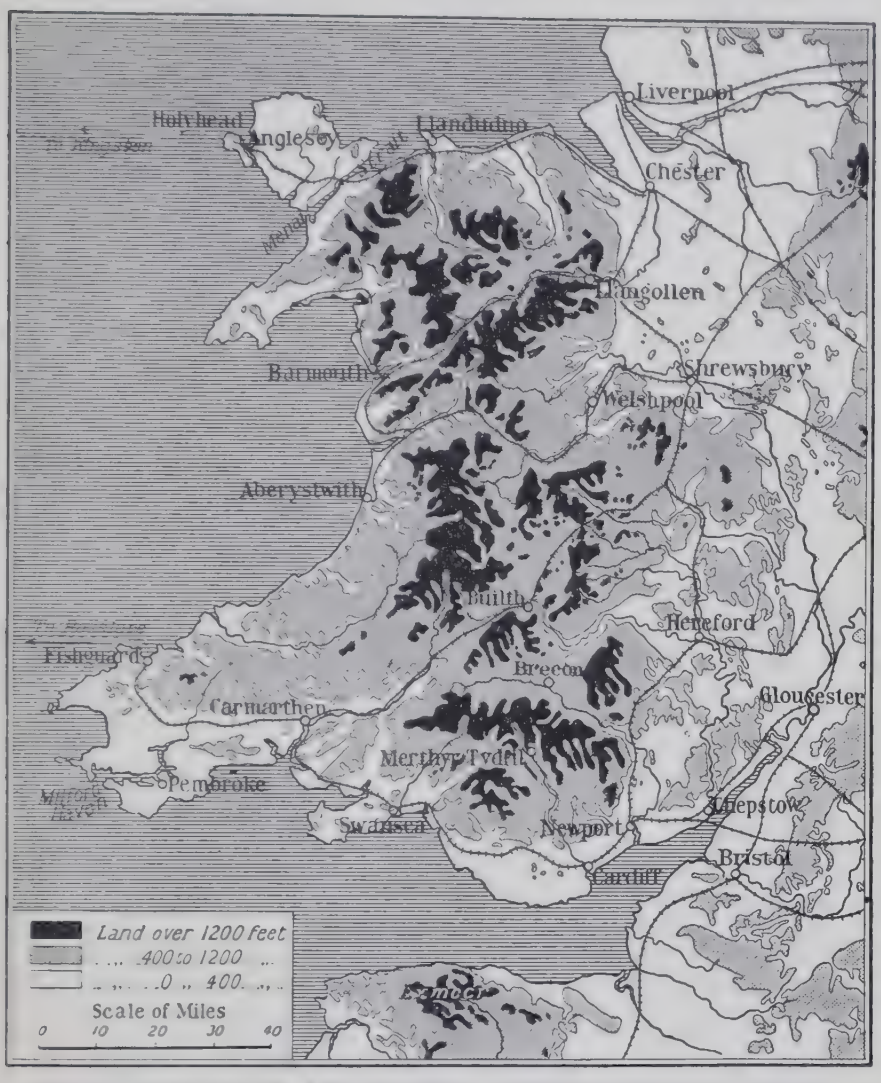

FIG. 17.—THE RELIEF AND RAILWAY COMMUNICATIONS OF WALES.

Brecon higher up the valleys, in counties belonging to Wales (see Fig. 17).

On the map we can see how compact a mountain

mass Wales is. Also we are able to pick out features which it would be difficult to see merely by flying over in an aeroplane or climbing the mountain peaks. A large sweep of the sea makes Cardigan Bay and brings the shore-line close to the high plateaus above which rise the heights of Plynlimmon, Cader Idris, and Snowdon. To the north and south of the bay are long and somewhat broad peninsulas which end in rugged headlands and groups of rocky islands. In the north, the Isle of Anglesey has been separated from Carnarvonshire by the narrow, river-like Menai Strait, but by the construction of a long tubular bridge for railway traffic, and a suspension bridge for other means of transport man has joined it to the mainland. In the south, the long narrow inlet of Milford Haven does not cut off an island as does the Menai Strait. It forms, however, a large, deep, and safe harbour for ships, but unfortunately the region round about is not an industrial area, so that the harbour is of little value except for naval vessels.

These north-west and south-west projections of Anglesey and Pembroke are comparatively low, but the main mass of Wales, extending north to south from Liverpool Bay to the Bristol Channel, is mountainous and plateau-like. In many places large areas of massive country tower still higher above the general level, giving beautiful mountainous scenery but poor country in which to live.

We have seen how Plynlimmon looks down on the narrow plain that borders Cardigan Bay. Farther north, the Snowdon Range, containing the highest peak in South Britain, continues the line of the Lleyn Peninsula and runs parallel to Menai Strait.

Round the wild highland scenery of Snowdonia, with storm-beaten sea cliffs or sandy beaches to north and south, a large number of summer pleasure-resorts have sprung up—Colwyn Bay, Llandudno, and Penmaenmawr in the north, Pwllheli and Criccieth in the south. South-west of Snowdon the Berwyn Range follows a similar direction. Indeed, it is very interesting to note how in South Wales and Central Wales the mountain masses and principal river-valleys follow the same direction as the Lleyn Peninsula and the Menai Strait.

In the south, the highest massive country is called the Brecon Beacons, with Black Mountain to the north-east. The country hereabouts is much less rugged than in the north and the valleys somewhat wider with more fertile land that can be cultivated. From the Brecon Beacons streams flow southwards to the Bristol Channel across the Plain of Gwent. The heavy rains and mists which come with the westerly winds and fall on the mountains and vales of Wales keep green the moorland pastures and fill the streams with water. Everywhere waterfalls add to the scenery, and some day may be used to make electricity for the needs of man. But these mountain streams bring down a great amount of silt, often in flood time spreading it over the floor of the valley, where it produces rich meadow-land for dairy cows or hay, or, if now above the flood, it can be ploughed and cultivated for turnips, mangolds, and possibly barley or oats.

Of all this farming country the richer parts are the lower lands of Pembroke and Carnarvon; the eastern valleys, which lead down to the English

Plain ; and especially the south, where from the plain of Hereford and the lower Severn Valley, fertile land extends in an almost unbroken line to Pembroke in the west. Just as the Normans in their conquest of Britain built their castles along the plain that separates Wales from England, so Norman barons conquered the plain of Gwent and, passing along the southern route, actually crossed to Ireland, where the harbours of Waterford and Wexford gave entrance to the Irish Plain.

Many an interesting story can be told of the struggles which have taken place between the men of the mountains and the men of the plains and valleys. As invaders succeeded in driving the people from the valleys, these folk took refuge in the mountains, often coming down to the plains to raid the cattle and crops of the invaders. One day you must read the story of " The Lady of Lynn y Fan Fach," which tells how, in spite of the differences, a young man from the valley sought to marry a beautiful lady from the mountain lakes. For years they lived together happily, and then an unfortunate accident compelled the lady to leave her husband and go back to her own people.[1]

In historical times, Welsh and English fought each other for centuries. The Welsh could not entirely defeat the English, and the English found it almost impossible to carry the war into the heart of the mountains. In the end, each came to respect the other, and from that time onwards the eldest son of the King of England has been the Prince of Wales.

[1] See " Ancient Tales from Many Lands," R. M. Fleming.

The new political relations whereby England and Wales acknowledged the same sovereign gave opportunity for the Welsh to enter into the wool trade, which then formed England's most important commerce. The "woolsack" was the chief seat in the House of Lords, and the Company of Drapers, which afterwards came into existence, was a very

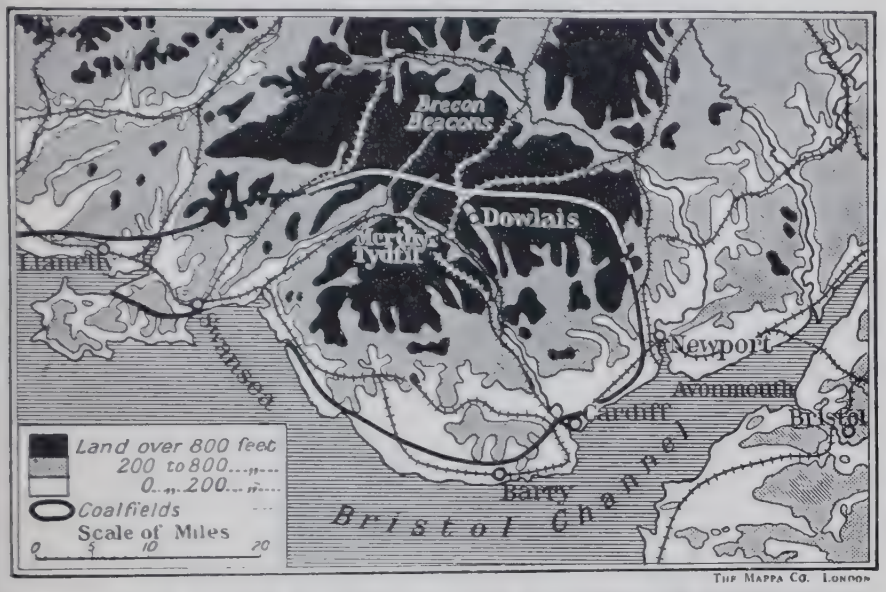

FIG. 18.—THE RELIEF, COALFIELDS, AND RAILWAYS OF SOUTH WALES.

wealthy body of merchants. Among them were many able Welshmen, and many Welshmen still hold important interests in the woollen trade, though the supplies of wool from Wales are small compared with the total amount now required.

But times have changed since Wales exported only wool. To-day from valley farms and mountain pastures, milk and meat are sent to the large towns which cluster on the coalfields to the east and south

of Wales. The greatest change of all has come with the use of coal. We shall learn later how coal has changed the character of our industries, but we may say here that in modern times large towns have sprung up on the great coalfields, manufacturing in large quantities the goods for which they are most suitable.

In South Wales between the Brecon Beacons and the sea a great basin of excellent coal lies below the surface rocks. The region is approximately the county of Glamorgan. Fig. 18 shows how rivers flow in a general direction from the north to the Plain of Gwent, entering the sea at either end of the southern hilly districts. Along these north-south valleys many collieries and mining villages have sprung up, and busy railways carry the coal to the eastern group of ports and towns of Newport, Cardiff, and Barry, or to the western group of Swansea, Port Talbot, and Llanelly (see Fig. 19).

The abundance of local coal and iron, and of Cornish copper, lead, tin and zinc, gave to South Wales a special interest in the smelting of metals and the manufacture of metal goods. As the industries grew and local supplies failed or were not sufficient, ores could be brought from foreign countries with comparative ease. Moreover, coal always formed a ready cargo for ships to take back, for coal is useful everywhere and few places are so well off for coal as Britain.

Dowlais and Merthyr Tydvil in the north of the coalfield have the largest iron-smelting works. At the ports, particularly Swansea and Cardiff, in addition to iron-smelting, there are works for the

Photo by Central Aerophoto Co., Ld.

FIG. 19.—CARDIFF FROM THE AIR.

Compare the character of that part of the city shown in the top half of the picture with the lower half. In what direction was the view taken?

smelting and manufacture of copper, tin, zinc, and lead. In modern times there is a great demand for copper, either in the form of sheets or wire, for very many purposes, one of which is for electrical apparatus and equipment. One of the difficulties with iron is that it so readily rusts in air. Bridges and exposed iron-ware must be painted constantly and thin iron soon rusts into holes.

An exceedingly fine covering of tin or zinc will prevent the air acting on the iron and so preserve it for a very long time. Tin plating and zinc plating are two other important industries, making possible the use of iron in innumerable ways as "tins," galvanised iron, and wires. Mining and the metal trades are the characteristic industries of South Wales and coal is its principal export. Barry is the largest coal exporting port and is well equipped for quickly loading the steamers from the scores of coal trains which can run alongside the boats.

The northern coalfield, situated in Flint and Denbigh, though locally important for the supply of coal, does not compare in either size or importance with the coalfield of South Wales, nor is the surrounding district so much spoiled by works and pit-banks—which, useful as they are, make blots on the once-beautiful landscape of the south.

In the north-west, in the neighbourhood of Bethesda and Blaenau Festiniog, quarries yield large quantities of slate. The hard rock splits into thin slabs which form excellent roofing material in place of the old-fashioned thatch.

The construction of roads and railways has met with many difficulties, though, in most cases, these

very difficulties make the routes very beautiful. The principal lines run along the coastal plains of South and North Wales. The Great Western main line passes through the towns of Newport, Cardiff, Swansea, and Llanelly, and the industrial region of the southern coalfield. Thence it runs through Carmarthen and across agricultural country to Fishguard, the Great Western Railway port for Ireland.

In the north the London, Midland and Scottish Railway runs from Chester to Holyhead (see Fig. 44). This railway journey is one of the prettiest in the country. After leaving Chester, the long flat sands of Dee stretch away to the sea. Then as the high land is approached, the plain narrows and for many miles the train runs near to the sea.

Along the coast are pleasure-resorts and holiday centres such as Rhyl, Colwyn Bay, Llandudno, and Penmaenmawr. The North Wales coast forms a great playground, with the sea in front and mountain and valley behind, for the busy workers of the neighbouring coalfields of England.

SUGGESTIONS FOR PRACTICAL WORK

1. Make three maps of Wales showing the land over 600 feet. On the first map shade the position of the Welsh coalfields and insert the chief railway lines. On the second trace the county boundaries, and, using figures to be found in a book of reference, shade those counties where there are more than 600 sheep per 1,000 acres, and those where there are over 200 cattle per 1,000 acres. On the third you must also draw the county boundaries, and, by reference to the figures of the 1921 Census, shade the counties to show the

distribution of the population according to a suitable scale which you must select yourself.

To each map you must add a written description which brings out the facts illustrated by the three maps you have drawn.

2. You have noticed that many north-south flowing rivers flow across the coalfield of South Wales and that the mining villages are located in these river valleys. Why is this? Can you illustrate your answer by a diagram?

3. You must have noticed that many of the physical features of Wales run in a north-eastern—south-western direction? Make a list of as many as you can find. Can you account for this well-marked feature of Wales? Can you find other examples in the British Isles?

4. If during the holiday month of August you could discover the home addresses of the holiday makers staying at Aberystwyth, Llandudno, and Tenby respectively, from which parts of the country do you think the majority would have come in each case?

CHAPTER VIII

MOORLAND AND LAKELAND

North of the English Plain the moorland and highland system differs very much from Wales and Cornwall in the west. The Pennine Chain extends from north to south, practically from the Cheviots, or rather the Tyne Gap, to the low hills of South Derbyshire. The southern or Derbyshire end of the Pennines is known as the Peak District. It is considerably broader than the main portion of the Pennines, but, on the whole, is not so high.

The Peak District forms a low moorland area drained by the Dove and Derwent, tributaries of the Trent, a river which makes a great sweep round the southern end of the Pennines. Years ago, before the days of the motor roads and railways, the routes to the north kept either eastwards along the Vale of Trent or westwards through the Midland Gap. Only during the past century has Derby become a gateway to the north. To-day main-lines of the Midland Railway, now part of the London, Midland and Scottish Railway (see Fig. 44), from London and from Birmingham and Bristol meet at Derby. Then the line follows the Derwent Valley for about eighteen miles to Ambergate, where it again divides. One route crosses the eastern areas to Chesterfield, Sheffield, Leeds, and the north; the other and more beautiful route

runs to Manchester through Matlock and Bakewell, with a branch line to Buxton and other tourist centres. A journey along the western line, or better still a holiday at Matlock, Bakewell, or Buxton, would show how extremely beautiful is the scenery, though the land itself has little farming value compared with the English Plain. Along the eastern route, on the

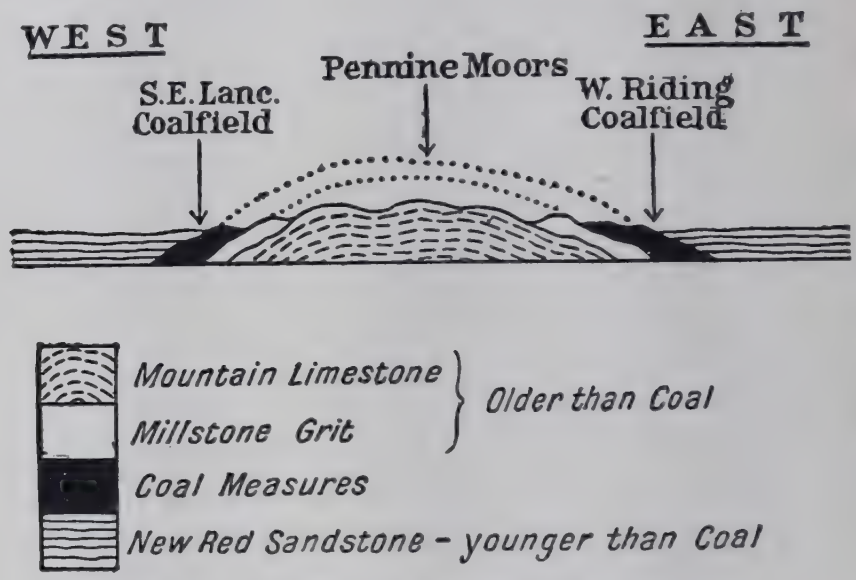

FIG. 20.—SECTION OF PENNINE CHAIN.

other hand, we should see how equally beautiful scenery has been spoilt by man through his working of the coalseams and the erection of iron and steel works near the collieries.

The Peak District consists largely of limestone. We have learned of the oolitic limestone hills that stretch across the country. The rock which forms the core of the Pennines (see Fig. 20) and much of the central, though not the highest areas, differs both

Photo by Underwood Press Service.

FIG. 21.—CHEDDAR CAVES—THE FAMOUS STALAGMITE CALLED "THE SPEAKER'S MACE."

On the right is seen a stalactite and a stalagmite growing towards each other; on the left is a continuous column. The electric light, by which the photo was taken, is seen on the right. Where are the Cheddar Caves? Are they composed of the same kind of limestone as the caves of the Peak District?

in origin and character from the oolitic limestone. It is often spoken of as mountain limestone, or, because it is related to the coal-measures, " carboniferous " limestone. It is a region in which rain and water play strange tricks. Springs gush out from the hillsides ; streams disappear down " swallow holes " and flow great distances underground. Caves and caverns abound, some quite small, others vast and temple-like (see Fig. 21).

Over most of the limestone moors the rain quickly disappears, either by running off in surface runnels or sinking through the limestone rocks by means of the many cracks found in them. Consequently the moors in most places lack sufficient moisture for the cultivation of crops. Even the hawthorn hedges, so common in other parts of England, are almost absent from the moors, and stone walls divide the fields from each other.

In some places, strangely enough, the land is waterlogged and boggy, but this is as difficult for cultivation as being too dry. Many parts indeed are covered with gorse or heather, though most of the country is good pasture land. Periods of drought make the farmers anxious on account of the cattle, since it is then difficult to obtain water for them to drink.

Where, however, the rivers and streams have cut their valleys in the limestone, the dales so formed are extremely pretty. White, steep-faced crags of limestone clothed with trees where roots can obtain a hold on ledge or in crack look down on babbling brook or rushing torrent. Dovedale, Monsal Dale, and Miller's Dale are but a few of these beautiful

Photo by Central Aerophoto Co., Ld.

FIG. 22.—MATLOCK BATH ON THE DERWENT.

Notice the deep valley along which runs the main road, with the steep limestone cliff towering above it. The railway has to tunnel through the cliff side. Compare the wooded lower slopes with the less wooded limestone surface.

valleys, famous as holiday resorts. Visitors in summer see the cliffs clothed with green and the river flowing gently in spite of its occasional hurry over the gravelly shallows. In winter when snow covers the land, or in springtime when the thaw fills the rivers to overflowing, the scene is very different. These are the times when Nature does her chief work in carving the scenery which charms the Peak District tourist.

Where the limestone is specially pure, as at Peak Forest and Buxton, extensive quarrying is carried on and the limestone sent to the iron-works to be used in the process of smelting, or burned in kilns for lime.

North of the Peak the character of the country changes. Instead of deep, gorge-like valleys, the rivers, especially those which flow eastwards towards the Ouse, have comparatively wide valleys with farms and villages, though always on the western skyline are the high ridges of the Pennines.

On the west the slope of the Pennines is somewhat steep, but on the east the Tees, Swale, Ure, Nidd, Wharfe, and Aire have dales wide enough to encourage farming, and within the dales are market towns where the " dalesmen " meet and have met for many a long year. Out in the dales and on the moors sheep and cattle are reared. Centuries ago these dales supplied western Europe with raw wool, and even to-day they send not a little to the mills of the West Riding.

On the plain of the Ouse, or the Vale of York as it is sometimes called, agriculture is carried on along with stock raising. Dalesmen and plainsmen had much that they could exchange, and a group of market towns grew up at the entrance to the dales, often where two dales opened to the plain and dalesmen of

one valley met the dalesmen of another, and both met the plainsmen from the Vale of York and the travelling pedlar or merchant making his way along the eastern route.

Both at the head of the dales and in between them the land is usually rugged and poor, with massive outcrops of rock resembling the ruined masonry of an old castle. These moors consist of sandstone—millstone grit—which overlies the limestone except on the highest moors, although even there patches of the gritstone still remain and form the highest peaks like Cross Fell, Whernside, Ingleborough, and Penyghent.

Just as in places Nature has left hard cappings of rock to form the towering peaks, so in places the rivers and running water, helped no doubt by other causes, have removed much of the rocks to form their valleys. Not only do the valleys give the farmlands of the dalesmen, but they help to form routes and passes or gaps across the mountains. Two of these, the Aire Gap and the Tyne Gap, are specially important, because of the comparatively easy routes they offer for roads and railways.

Towards the north-west the low height of Shap Fell joins the Pennine system to the Lake District, another group of dales and fells or grassy mountain slopes. The long Eden Valley and the shorter valley of the Lune divide Lakeland from the Pennines, whilst Morecambe Bay and Plain to the south and Solway Bay and Plain to the north give to the Lake District a somewhat isolated character.

A line of highlands from Scafell Pike to Shap Fell divides the region into two, though from the map it can be seen how the rivers and dales radiate roughly

from the centre to the south, the west, and north. These long and somewhat narrow dales are often so obstructed by natural dams of rock fragments left by the ice sheets which long, long ago covered the region, that lakes are formed. These, like the dales, are long and narrow. Where streams flow in, bringing by their torrents rocks and soil from the hillside, there they deposit their débris, and deltas are formed. The

F

This is a typical scene in the Peak District – the steep-sided, winding stream, with scatte
The train has just emerged from the

low alluvial plains form excellent meadows and arable land, though occasionally the rivers rise and flood them.

Derwentwater and Bassenthwaite are one example out of many where the deltas of mountain streams have divided one long lake into two, and the town of Keswick occupies a site above flood level in between the two.

We have spoken already of the line which divides the northern set of valleys from the south, and as

Keswick is the centre for the northern group, so Ambleside on the other side of the pass of Dunmail Raise is the centre of the southern group.

Like the Peak, the Lake District is famous for its scenery. Here, however, long lakes of clear water and groups of high, smooth, cone-like peaks, as well as rugged mountain forms, give scenes of beauty which Derbyshire cannot offer. Unfortunately for

NSAL DALE. *Reproduced by permission of the London, Midland and Scottish Railway.*

s divided by stone walls on the lower flanks of the hills, with moorland pasture on the top. ssing the valley by a high viaduct.

the tourist, the warm westerly winds bring damping mist and drizzle and often heavy rain. Such weather, though it spoils our comfort, is really part cause of such exquisite scenery, clothing the hillsides with verdure and giving storm-cloud and light effects through the blending of land and atmospheric conditions.

Such scenes as these attract the poet and the artist perhaps more than the tourist, though of course many more people visit the Lake District for pleasure

than for art. Round Ambleside and Grasmere is Wordsworth-land, and to the north round Keswick is

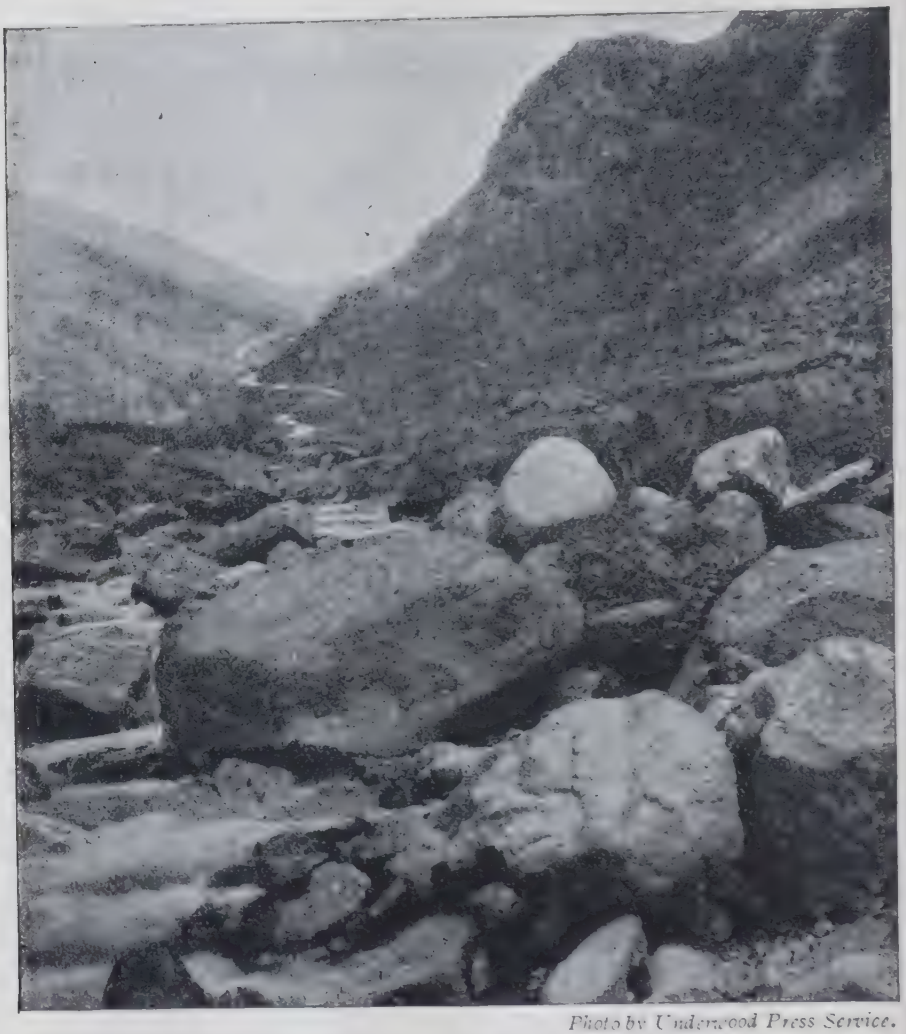

Photo by Underwood Press Service.

FIG. 24.—HONISTER PASS IN THE LAKE DISTRICT.

Notice the size of the masses of rock broken from the hill-side by frost, and tumbled along by the stream in the spring torrents. What finally becomes of these rocks? Notice that the road takes advantage of the pass.

the land which so delighted Southey. In the early part of the nineteenth century a number of poets,

including Wordsworth, Southey, and Coleridge, lived in the Lake District. They wrote many poems describing its charms, and are often spoken of as the "Lake Poets."

The following stanzas are taken from a poem about a dog that for three months watched beside the body of his master who, in attempting to cross over Helvellyn to Grasmere, had slipped from a steep part of the rock and perished. In them Wordsworth describes the awful loneliness of Helvellyn as well as the beauties of storm and sunshine effects.

HELVELLYN

It was a cove, a huge recess
That keeps, till June, December's snow;
A lofty precipice in front,
A silent tarn below!
Far in the bosom of Helvellyn
Remote from public road or dwelling,
Pathway, or cultivated land;
From trace of human foot or hand.

There sometimes doth a leaping fish
Send through the tarn a lonely cheer;
The crags repeat the raven's croak.
In symphony austere;
Thither the rainbow comes—the cloud—
And mists that spread the flying shroud;
And sunbeams; and the sounding blast,
That, if it could, would hurry past;
But that enormous barrier holds it fast.

WORDSWORTH.

In the following lines Southey gives a wonderful description of the Falls of Lodore after heavy rain. In a dry season it is reduced to a tiny trickle of water scarcely noticeable.

THE CATARACT OF LODORE

Gleaming and steaming and streaming and beaming,
And rushing and flushing and brushing and gushing,
And flapping and rapping and clapping and slapping
And curling and whirling and purling and twirling,
Retreating and beating and meeting and sheeting,
Delaying and straying and playing and spraying,
Advancing and prancing and glancing and dancing,
Recoiling, turmoiling, and toiling and boiling,
And thumping and flumping and bumping and jumping,
And dashing and flashing and splashing and clashing—
And so never ending, but always descending,
Sounds and motions for ever and ever are blending,
All at once and all o'er, with a mighty uproar—
And this way the water comes down at Lodore.

ROBERT SOUTHEY.

We have now seen how the highlands of the Pennines and the Lake District give us some of our most beautiful inland pleasure-resorts. Years ago, before the days of railways, tourists and general holiday makers seldom visited these regions. Then the moors and dales formed out-of-the-way homes, pleasant enough in the summer, but wild, bleak, and snow-clad in the winter. The high towering peaks often untrod became the beacon heights in time of danger.

Now round the Pennines busy industrial regions have sprung up, penetrating the lower parts of the dales up many of which toil heavily-laden motors and long trains showing how much the Pennines have been invaded by the industry of man. Still, much remains unspoiled, and there weary workers can spend a week-end or a longer holiday. The moors and dales form food-lands and pleasure-grounds within a ring of busy workshops.

SUGGESTIONS FOR PRACTICAL WORK

1. From your atlas find out the length of the Pennines from north to south. Then find out their approximate average breadth. Now find out the average height of the moorlands which form the central Pennines. About how many times are the Pennines as long as they are broad? How many times are they as broad as they are high? Would you agree with the description of the Pennines as broad, fairly high moorlands, standing above the plains which border them on the east and the west, something after the same fashion as the king's head on a penny stands out in low relief above the flatter parts of the coin?

2. Study a map of the Lake District on as large a scale as you can. What general scheme does there seem to be in the arrangement of the lakes? Can you find two lakes in one valley? How do you account for this? What is characteristic of the shapes of all the lakes? Why is this?

3. Who were the Lake poets? When and where did they live? Why did they seek homes in the Lake District?

4. If you were to travel by aeroplane in a direct line from York to Maryport, what striking differences would you notice in the country you would fly over?

5. Make a section, true to scale, from Brecon to Leeds. What facts does it bring out?

CHAPTER IX

INDUSTRIAL ENGLAND

Until little more than a century ago the English Plain was by far the most important region of the British Isles and contained the greater part of the population. Roughly square in form, it has on the east and south the Narrow Seas with their activities of fishing and European commerce ; and on the west and north the mountainous districts of Wales and the Pennines. London, the capital, as we have seen, stands where the natural routes of the Plain come to a focus at the head of the navigation of the principal maritime entrance.

While the use of coal remained unknown, agriculture formed the principal occupation, and goods were made, not in large mills and factories, but at home or in small workshops employing but few people.

The wonderful discoveries of the uses to which coal might be put altered the whole character and manner of living, not only in the British Isles but in Europe and North America, and finally in most of the remaining countries of the world. For centuries, of course, it had been known that the black rock which we call coal, like peat or wood could be used as fuel to warm houses during cold and damp weather. For this purpose, wherever coal could be obtained

easily, it was gathered and stored as men gathered faggots and peat blocks for winter use.

Iron, so important a metal for weapons and implements such as swords, spears, ploughs, and spades, could in those days be smelted only by charcoal and in small quantities. The iron-works, even in the days of Nelson, were located near the forests of South and Central England, as in the Weald, near the New Forest, the Forest of Dean, and Cannock Chase. Most of the old iron-work of the London district was made in the Weald. During the Civil Wars of the seventeenth century most of the swords and arms used by the Parliamentary Army were made in or near the Forest of Arden and Cannock Chase.

The timber, by a special process of burning, gave the charcoal, and bands of iron-stone or iron-ore were fairly common in certain forest neighbourhoods. The series of discoveries which showed how blast-furnaces could smelt iron-ore by means of coal and limestone began the migration of the iron-works from the neighbourhood of the forests to the localities which had coal. The quantities of iron that could be smelted were also considerably increased.

Another series of remarkable inventions showed how machines made of iron, larger and more powerful than the wooden ones worked by hand, could be made to do all kinds of work. There remained, however, the difficulty of finding power to drive such large machines. In the old days animals, or even the men themselves, could turn or work the small machines. Gradually the mountain streams or swiftly flowing rivers were made to turn large water-wheels, and these in turn worked the large machines. Even

before the days of coal, numerous works became established along the mountain-streams of the Pennines, the Lake District, and Wales because of the water-power which could be obtained there.

A further series of inventions added still another use for coal. The discovery of the steam-engine supplied a means whereby the largest machines could be worked without any direct effort on the part of man and also without the uncertainty of the water-power on account of frost in winter or drought in summer. When, a little later, steam was applied to the locomotive engine and to ships, the great difficulties of transport also were largely overcome.

Coal, more coal, and still more coal became the constant demand of the manufacturers whose industry depended upon a large and constant supply of fuel. In the days when coal was used merely for domestic purposes, the demand could be supplied from surface workings or shallow pits. Any attempt to sink deep shafts was checked by the flow of underground water to the workings, and no pump had then been invented which could keep the workings drained. New pumps worked by steam overcame this difficulty, and shafts could be sunk through the agricultural soils and surface rocks to the coal below, wherever it existed and was not too deep down.

That was the great problem. Where did coal exist at a depth not too great for working? Fig. 25 shows the distribution of coal, not where it is on the surface, but where it can be worked either at the surface or by means of shafts. Fig. 20 shows, for example, how the coal dips deeper and deeper under the surface rocks on either side of the Pennines.

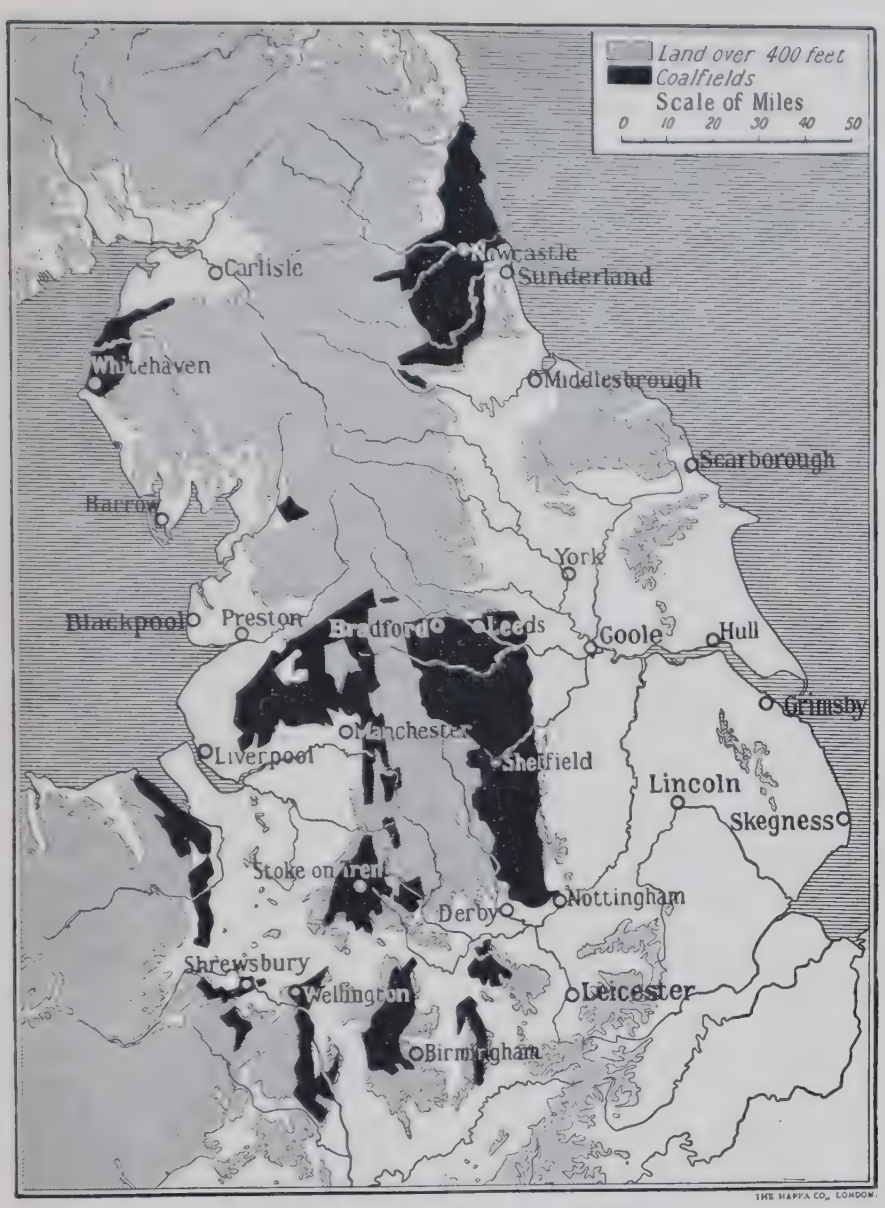

FIG. 25.—THE ENGLISH COALFIELDS.

The coalfields, as the areas where coal can be worked are called, became the basis of the new industries. The map (Fig. 25) shows that the English coalfields lie on the eastern and western flanks of the Pennines and round its southern end. The coalfields do not form a continuous belt, but it can readily be seen that they are related in position to the Pennines. They are related in their structure also.

The Pennine Chain is an example of what is called a folded structure, that is, the rocks have been forced by tremendous *lateral* pressure to rise slowly from a horizontal position to a folded one. The original position of the coalfields and the other rocks shown in Fig. 20 must have been horizontal, though that time was long, long before any people lived on the earth. As the land was slowly, very slowly, raised, so the frost and rain endeavoured then, as now, to wear away the highest parts. Thus the coal, and in most places the millstone grit, were removed from the highest parts both of the main ridge and in some places from the flanks. Thus the coalfields now spread round the Pennine moorlands, but are broken into greater or lesser coalfields.

In the last chapter we learned how the streams and rivers had made deep but wide dales along the Pennine flank, and it is obvious that in the dales upon the coalfield the coal could be more easily reached than on the moors between.

While, therefore, the English Plain continued to grow food and indeed to produce greater and greater quantities of food, new industries sprang up on the north-west portion of the Plain and its east and west extension, that is, on the area farthest from London

and surrounding the Pennine Chain, though some of the southern coalfields are at a considerable distance from the Peak.

The towns on the Plain are few and far between. They are the market centres of the farming villages around and the intellectual and social centres of rural England. The new towns which grew up on the coalfields are entirely different. Near to the collieries blast furnaces, steel-works, mills, and factories sprang up, and near the works hundreds of houses were built as homes for the workpeople. As industry increased, so more towns sprang up and older towns grew in size, until to-day scores of towns, each larger than the market towns of the Plain, cluster on the coalfields so close together that it is often difficult to see where one town ends and another begins.

The countryside, once as beautiful as the unspoilt parts of the Pennines and Midland Plateau, is to-day blackened by the smoke of scores of chimneys and marred by enormous banks of slag or cinder or other refuse from the works. Yet industrial England, the Industrial North as it is often called, has many great advantages. England owes its importance in the modern world, not to its wheat and cattle—though these are important—but to its iron and steel goods, and its textiles of wool and cotton. These are the manufactures of the coalfields—the workshops of Britain.

Here, in normal times, thousands of people find abundance of work at wages considerably higher than those of the agricultural labourer, and the towns become centres for much besides the manu-

facture of goods. Good schools and universities, libraries, theatres, and all kinds of educational facilities are possible in such large communities. Newcastle, Leeds, Bradford, Sheffield, Manchester, and Birmingham are but a few of the great towns—centres of large town groups—which have grown up with the new industries on the coalfields of England.

SUGGESTIONS FOR PRACTICAL WORK

1. If there is coal beneath London, would you expect to find it deeper in the earth than it is in the Birmingham district? Why would you not expect to find coal in Cornwall?

2. What inventions are associated with the names of Chadwick, Watt, Arkwright, Stephenson, Brindley, Bell?

3. Find out from a book of reference the amount of coal raised in each of the British coalfields. Represent these figures in some graphical manner.

4. When, in winter, you are sitting near a warm fire reading a book, have you ever thought of the miner who toils deep in the earth to get the coal? What are the special dangers that he has to face?

5. Consult a book of reference (e.g. the "Statesman's Year-book") in which is given a list of the towns in England and Wales which have over 100,000 inhabitants. Plot these towns on an outline map. What proportion of them are on or near coalfields? How many of those away from coalfields are ports? How many are left? Explain these facts.

CHAPTER X

THE INDUSTRIAL REGIONS

When we were discussing the agriculture of England, we learned that the special kind of farming carried on in any area was determined by many factors. The relief, the kind of soil, the total amount of rain, the number of rainy days and the season of their occurrence, are but a few of the considerations which a farmer must take into account. In other words, he chooses that kind of farming most suitable to his district.

In a similar way the industries which develop on the coalfields are usually those best suited to the locality. Let us take some of the larger coalfields and examine their particular conditions and the industries which have grown up. The Northumberland and Durham coalfield extends to the sea, and has flowing across it the rivers Tyne and Tees. The coalfield has therefore a good waterway and ready access to the sea. Most of the countries round the North Sea, and of course London and the south of England, have little or no coal, so that one great industry is the mining of coal for export. There is this great advantage too, that from the forests of Norway, Sweden, Finland, and Russia ships can bring pit-props for the collieries as well as timber for other purposes.

A little to the south of the coalfield, the oolitic limestone hills that stretch across the English Plain terminate in the Cleveland Hills, which contain rich iron-ores. Indeed in many places along the oolite hills—in Lincolnshire and round Northampton particularly—iron-ore is quarried and smelted. The advantage of the Cleveland Hills is not only the richness of the iron-ores but the ease with which the coal can be obtained and the nearness of a pure limestone which in the blast-furnace assists the smelting of the iron.

Middlesbrough and district are thus engaged in the iron and steel industry, and this, combined with the facilities of the Tyne waterway, has given rise to shipbuilding. This industry requires not only the enormous plates of which a ship is made, but engines of all kinds, whilst war-vessels also need armour plate and guns. Newcastle, Gateshead, Tynemouth, North Shields, and South Shields are but the largest towns along a river whose banks form one long busy scene of shipping and shipbuilding.

What changes time makes in the importance of a town is seen at Durham. The castle and cathedral stand on the rocky hill almost surrounded by the Wear. In former days the castle stood as the great bulwark of England against the northern foes. To-day that danger is past, though the castle (now the University buildings) and the cathedral remain. The new industry of iron and steel has resulted in the growth of new industrial towns on sites more suitable than Durham, leaving this city an old-world town amid a mining and manufacturing area.

Farther to the south lies the second of the eastern

Pennine coalfields, known as the York, Derby, and Nottingham coalfield. This stands much nearer to the Pennines and is separated from the sea by the Vale of York and the hills of eastern Yorkshire—the Wolds and the Moors. In a previous chapter we learned how the Pennine moors and dales form pasture for sheep whose fleeces supply large quantities of wool. Though at first the wool was largely exported to Europe, the industry settled later in England, but was at first very small compared with the woollen industry of to-day. Still, even then it employed a number of people, and the woollen industry became established in many hilly regions where sheep obtained good pasture. The hill-streams contained water good for washing wool, and later they made possible the use of water-wheels for working the larger machinery then invented. In the West Riding, as in other regions, woollen goods were manufactured even before the new uses of coal were discovered. Then, as we have seen, coal became the deciding factor in industry on a large scale, so that to-day the woollen industry of the West Riding towers high above such woollen industries as are established in Somerset and Gloucestershire and in the valley of the Tweed. Leeds and Bradford form the centre of the group of woollen towns, where the occupations are not only spinning and weaving and the making of clothing, but the manufacture of the machines—engines, spinning machines, and weaving looms—that are required to carry on the woollen industry.

So great is the demand for wool that the English supply is totally inadequate. From the sheep-lands of Canada, New Zealand, Australia, and South

America raw wool is brought for manufacture in Yorkshire. Similarly the amount of cloth made far exceeds the quantity required in Britain; much therefore has to be exported to foreign markets.

This aspect of the woollen industry shows the need for good communications to the seaports by road, railway, and canal. In this respect the West Riding is well equipped. The great north-south railways, together with the cross-Pennine lines, connect the area with other parts of England. Here, too, is one of the few canal systems in England that really pay—the Aire and Calder Canal—carrying goods from the manufacturing towns to the port of Goole. Farther down the Humber, at a point to which fairly large ocean steamers can come, stands the port of Hull, the principal North Sea port for the West Riding. But roads, railways, and canals so join the West Riding to the western side of the Pennines that Manchester and Liverpool are also West Riding ports, though naturally their trade is largely with South Lancashire.

So far we have thought only of the northern portion of the York, Derby, and Nottingham coalfield. Farther south, extending from the neighbourhood of Sheffield through Chesterfield to Derby, the coal is utilised largely for the smelting of iron and the manufacture of steel. Near the Tyne such industries, as we have seen, became associated with ship-building. In these regions of Yorkshire and Derbyshire some of the works are largely connected with the manufacture of railway requirements — rails, engines, waggons, bridges. Derby, indeed, has locomotive and waggon works belonging to the L.M. & S.R. and was

formerly the industrial centre for the Midland Railway. In addition to railway plant other goods are manufactured as girders, cranes, and steel goods to be used by other manufacturers in the making of other machines. Sheffield has special works for guns and armour plate, and almost for centuries it has been the British centre for the manufacture of cutlery. Nottingham, which is towards the south-east corner of the coalfield, has long had lace and hosiery works and recently has developed in addition large engineering works.

These two eastern Pennine coalfields employ thousands of workpeople. It is not surprising, therefore, that the surrounding land is used for the production of food—vegetables and milk as well as meat and wheat—while in the Pennines and on the coast are many pleasure resorts where holidays may be spent—Matlock and Buxton in the Peak District, Scarborough, Bridlington, and Skegness on the coast.

West of the Pennines two coalfields correspond with those on the eastern side, though in many respects they differ. The more northerly coalfield is west of the Lake District at Whitehaven and Maryport. Here the coal workings actually run for some distance under the sea. Farther south the strait between Walney Island and the mainland gives a sheltered waterway, while in the Furness district iron-ore is found. Iron, easy access to coal, and a waterway have given rise to shipbuilding at Barrow, though the industry is considerably smaller than that of the Tyne ports on the eastern coasts of England.

Towards the south of Lancashire and along the foot of the Pennines lies the large coalfield which is

the western counterpart of that of the West Riding—the South Lancashire coalfield. Here the manufacture is largely cotton goods, and the reason for its location is peculiar. In the process of spinning cotton, a damp atmosphere has been found to be a great advantage, indeed it may almost be said to be essential. We have learned that the westerly winds bring with them moisture which they deposit largely on the western slopes of the mountains. A map will show that behind the Liverpool Bay the mountains make a curve round the plain of Cheshire and South Lancashire. All within what we may style this mountain-bay receives a great amount of rain, or rather, though the total rainfall is not excessive, the number of wet days makes the air almost always damp or humid. Here, then, is a coalfield with a humid atmosphere, so that its most suitable occupation is the manufacture of cotton goods. At the present day the spinning is done largely in a group of towns which includes Oldham, Ashton-under-Lyne, and Stockport. Farther north are the weaving and dyeing towns of Bolton, Burnley, and Blackburn. Manchester, itself, though the centre of the cotton industry, does not manufacture the cotton goods. It is the business centre where cotton is bought and sold. It has also great engineering works, while the cutting of the Ship Canal has made it a port both for cotton and other goods (see Figs. 42 and 43).

Thirty miles away stands Liverpool, the great west-coast port having trade connections not with South Lancashire only but with the whole of Britain. Liverpool, and Birkenhead across the river, have important shipbuilding activities, while Port Sunlight

is a reminder that Liverpool and district have important industries connected with oil crushing and the manufacture of soap.

Bleaching and dyeing are important processes connected with both the woollen and the cotton industries. For this purpose chemicals are required, and chemicals are largely obtained from salt. Round the southern extremity of the Pennines in Lancashire, Cheshire, Staffordshire, Worcestershire, and Derbyshire deposits of salt are found underground as rock salt. Instead of sinking shafts as for coal, deep wells are made and the rock salt is dissolved in water. The brine is then pumped up and the salt extracted. At Nantwich, Droitwich, and other salt-towns the tilting houses show how their foundations are giving way as a result of the removal of the rock salt. Widnes and Runcorn have chemical and iron industries, whilst St. Helens is noted for chemicals and glass.

North Staffordshire is the great pottery district with Stoke as the centre. Not only have the local clays been used for the manufacture of all kinds of earthenware, but china-ware is now made from china clay or kaolin brought from quarries in Cornwall.

Farther still to the south is one large coalfield within the north-west region of the Plain of England. The "Black Country" with Birmingham as a centre has long been connected with the iron industry, though only with the modern use of coal has it grown to such proportions and really become the "Black Country." The one great difficulty of this region is its distance from the sea. It rests, as it were, between the rivers Mersey, Trent, Avon-Severn, and Thames.

and though these rivers have been connected by canals, the distance from a port is a serious handicap. Even the railways, though they link the Black Country with the ports and with other regions, fail to take the place of a good port because of the heavy charges made for carrying goods by rail.

Iron and steel and other metal goods form the principal industries of Birmingham and such surrounding towns as Wolverhampton, West Bromwich, Dudley, and Coventry. At first much of the work was done in small workshops, each employing but few men. Nails, chains, tools, metal fittings, and a thousand and one other things were made. Some, though small, were as strong and lasting as the large machines for which possibly they were made. Other articles, especially ornaments of metal, appeared beautiful and attractive but lasted only a very short time. These industries, though small in themselves, were very numerous, and men, women, and boys became extremely skilful at their own particular trade.

Within recent years enormous foundries and factories have been established, manufacturing special goods requiring elaborate machines and also skilful men to work them. Look round your school and home and examine all the metal goods you can. Probably the majority of them have been made in the Black Country. In addition, there are engines and motors, bicycles and motor-cars, and the engines for aeroplanes. These are but a few of the special industries carried on in the Black Country. In almost every case the cost of the article is not so much the cost of the material of which it is made, as

of the labour and skill bestowed upon it. Contrast the amount of steel used in an enormous armour-plate with the same amount of steel made into parts of a bicycle. You may then realise why it is more convenient to make armour-plate in works near the sea where the vessels are built, while the parts of a bicycle may be made in inland regions like the Black Country.

We have now taken a general look over the occupations of England—the farming of the English Plain, the stock farming of the hills and mountains, and the manufactures of the coalfields. Some of the important industries of special towns we can only mention. Perhaps you can find a reason for them. London is a most important manufacturing centre for iron goods, furniture, clothing, chemicals, and railway plant. Indeed, it is not generally realised that London is one of the largest engineering centres in the world, that the number of Londoners dependent on the leather industry exceeds the population of Northampton or Leicester, and that the London printing trade employs an aggregate larger than the population of either Yarmouth or Chester. The port of Bristol has tobacco, sugar-refining, and chocolate works. Luton manufactures straw hats ; Northampton and Leicester boots and shoes. Lincoln, Grantham, Peterborough, Bedford, Chelmsford, Ipswich, and many other market centres have important iron-works largely engaged in the manufacture of agricultural implements.

So we might continue over areas other than the coalfields and see how the use of coal and the facilities of transport have resulted in a spread of manufactures into centres of agricultural England. But even so,

we may still think of England as shown by two, possibly three pictures : the great agricultural plain with its principal towns dotted about at a distance from each other ; the industrial regions of the coal-fields with manufacturing towns clustered close together ; and the mountain and upland country with scattered villages and small towns becoming more and more the summer pleasure-grounds for motorists and holiday makers from other parts of England.

SUGGESTIONS FOR PRACTICAL WORK

1. Why is it that :
   (*a*) Lancashire makes cotton goods ?
   (*b*) Sheffield is noted for cutlery ?
   (*c*) The West Riding of Yorkshire makes woollen goods ?

2. How do the industries on coalfields near the sea differ from those far inland ? Take your examples from the Tyne-side and Black Country coalfields.

3. What do you understand by the processes of (1) weaving, (2) spinning ? Find out which Lancashire towns do mainly spinning and which mainly weaving. Can you account for this specialisation ?

4. Draw a large sketch-map of the South Pennines and mark on it the different means of communication (road, rail, canal) by which the industrial regions of Lancashire and Yorkshire are brought into relation with each other.

5. Look up the total value of the exports from this country during the last ten years. What proportion each year represented exported (1) cotton, (2) woollen goods ? Would both cotton *and* woollen goods be sent to the same countries ? Give reasons for your answer.

CHAPTER XI

THE SCOTTISH LOWLANDS AND UPLANDS

The relief map of Scotland shows that the high land may be divided into three great divisions, the Southern Uplands, the Grampians and Central Highlands, and the Northern Highlands. The Grampians and the Northern Highlands are separated from each other by a long depression joining Moray Firth to Loch Linnhe, which is known as Glenmore, or the Great Glen. This depression is so narrow that we may well regard the Central and Northern Highlands as one great plateau region, and call the whole *The Highlands*.

Between the Highlands to the north, however, and the Uplands to the south, the low plain which joins the Firths of Forth and Clyde is sufficiently wide and important to be regarded as a separate region in itself. Small as it is compared with either the Southern Uplands or the Highlands, it contains the richest agricultural lands, three important coalfields, most of the large Scottish towns, and by far the bulk of the population. For these reasons we may divide Scotland into three regions :

1. The Southern Uplands.
2. The Central Lowlands.

3. The Highlands, divided by Glenmore into a central or Grampian plateau to the south and a Northern Highlands plateau to the north.

The deep inlets of the Firths of Tay, Forth, and Clyde, together with the lower courses of the rivers, give to the Lowlands easy sea communication,

FIG. 26.—THE CENTRAL LOWLANDS OF SCOTLAND.

eastwards to the countries of the North Sea, and westwards to lands across the Atlantic Ocean. A Forth-Clyde canal enables barges to go from the ports of one coast to those of the other, but serious thought is now being given to the making of a ship-canal across this level narrow part of Scotland.

The road and railway communications between the Scottish Lowlands and England, however, are some-

what more difficult. This is because of what in an earlier chapter we called the Central Highlands of Britain. The Pennines compel the principal roads and railways to follow an eastern or a western route. The Cheviots compel these routes to pass still nearer the coast, through Berwick on the east and through Carlisle on the west, while the Southern Uplands make the journey from England to the important region of Scotland still more difficult.

The Cheviots form the real barrier between England and Scotland. In olden times it was a wild, bleak moorland where a traveller might easily lose his way. Even now, though farms and hamlets nestle here and there in sheltered places, it is one of the wildest parts of Britain, especially in winter. In summer numbers of sheep, under the protection of shepherds and their dogs, roam over the hillside to graze on the short grass and among the bracken. As far as the eye can see the rounded tops of hills extend like a billowy sea, except where Cheviot rises to its height of almost 3,000 ft., overlooking the east coast route and seen as a landmark from the sea. Here and there are small clumps of trees, but over the greater part of the Cheviot Hills is moorland pasturage. Sheep are the farmer's most valuable possession. At the shearing season he obtains the fleeces which he can sell to the mills of the woollen towns in the Tweed Valley or the West Riding of Yorkshire. Then periodically he can send a flock down to market to be sold for food.

The poor soil, the high altitude, and the bleak, damp weather even in summer make cultivation difficult and limit it to a few hardy crops like potatoes,

turnips, rye, and possibly barley. These are naturally grown in the best places, usually near the farm.

Like Dartmoor and Exmoor, the Cheviots have many swamps and much bogland. These, of course, are dangerous to a stranger who wanders off the proper path. The peat bogs have their use, however, to the inhabitants. Coal and wood are extremely difficult and costly to obtain, especially as so much fuel is required during the long cold winter. The peat is cut and dried in summer and stacked near home for use in the winter much the same as in Ireland, where coal is equally difficult to obtain.

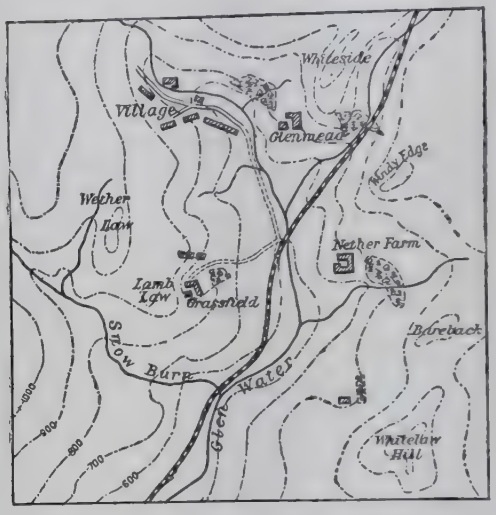

FIG. 27.—VILLAGE AND FARMS IN SOUTHERN UPLANDS.

Comment on the appropriateness of the names found in the map. Notice the location of the farms in relation to the relief of the land and the position of the plantations.

Winter in the Cheviots is far from pleasant, though the wild, snow-covered moors make the small farms and villages look snug and comfortable in the nooks and sheltered valleys. Many of the farms have been specially planned to get the greatest protection (see Fig. 27). Usually they are built in a hollow and a screen of trees helps to break the force of the cold north-easter, protecting both the buildings and the adjoining fields. All the buildings, even the farmhouses, are very low, to escape the wind as much as

possible, and all have long steep roofs to allow the heavy snow to slip off.

No wonder the Cheviots have few visitors and that the routes to the north take the easier ways which lead across the lower country of the Tweed Valley on the east and the Solway Plain on the west.

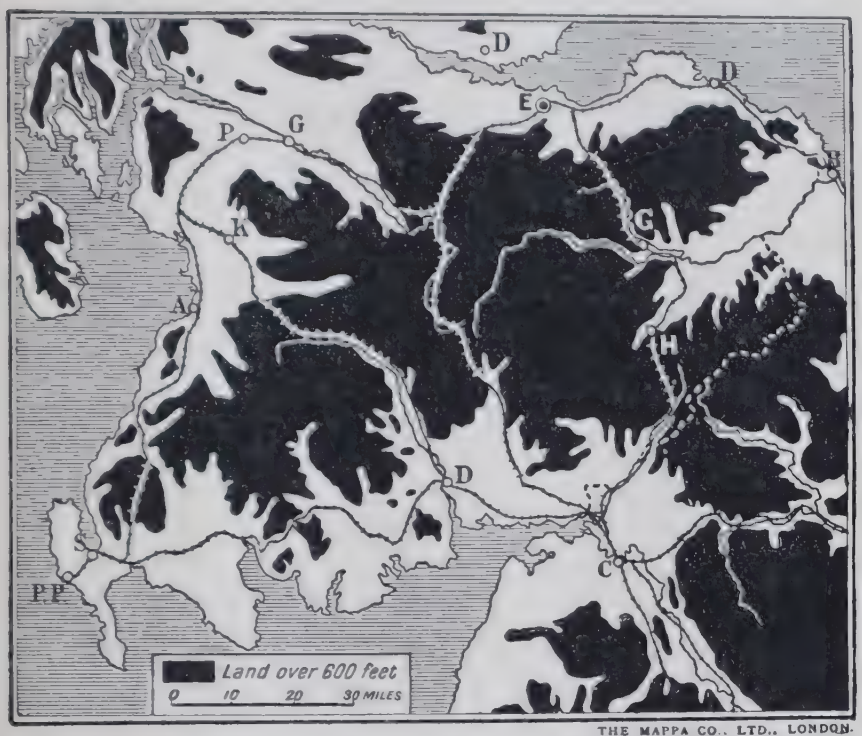

FIG. 28.—MAP OF THE SOUTHERN UPLANDS.

North of the Tweed and Solway is the broad north-east to south-west hill-country of the Southern Uplands (see Fig. 28). These uplands, however, are not so impassable as the Cheviots. Numerous rivers flow southwards, giving valleys or "dales" along which the roads and railways may pass to

reach the Central Lowlands beyond. These dales—Nithsdale, Annandale, Eskdale, Liddesdale, Teviotdale, Ettrickdale—are very like the dales of Yorkshire. In the wide entrance to the dale market centres like Dumfries and Hawick bring the dalesmen into touch with the world outside.

In the old days of border warfare these dales saw many a struggle as Scotch and English sought to raid each other's cattle.

The following lines are taken from a Border ballad :

"March, march, Eskdale and Liddesdale,
All the Blue Bonnets are bound for the Border.
Many a banner spread, flutters above your head,
Many a crest that is famous in story.
Mount and make ready then, Sons of the mountain glen,
Fight for the Queen and our old Scottish glory!

"Come from the hills where your hirsels are grazing,
Come from the glen of the buck and the roe;
Come to the crag where the beacon is blazing,
Come with the buckler, the lance, and the bow."

Railways and roads cross the Uplands, through Nithsdale to Ayrshire, through Annandale to Clydesdale, and through Liddesdale to the valley of the Tweed, and so to the plain between the Pentland Hills and the Firth of Forth.

The Tweed Valley is particularly beautiful and interesting. Here, as in the west, innumerable border raids and wars took place, and castles and abbeys show both the need for defence and the richness of the land. Sir Walter Scott in his writings describes much of this country which he loved so well and where he spent much of his life. Melrose and Abbots-

ford are among the many places connected with his life and writings.

To-day, in the old towns of the Tweed Valley, at Hawick, Peebles, Galashiels, many mills have been erected for the manufacture of woollen goods. Though they cannot be in any way compared with the enormous towns of the West Riding, yet they have one very great advantage in the beauty of nature which surrounds them. Smoke and houses have not yet blotted out the beautiful landscape which has charmed so many thousands of visitors.

The Central Lowlands are contained, as we have said, between the " Highland Line " which marks the edge of the Grampians and the northern slopes of the Southern Uplands. Parallel with the Highland Line and a few miles south of it is a line of hills known separately as the Sidlaw Hills, Ochil Hills, Campsie Fells, and Renfrew Heights, but altogether as the Northern Heights of the Lowlands. Between the Highlands and the Northern Heights extends a long narrow plain known towards the east as Strathmore or " The Great Valley."

From the north-west the Rivers Tay and Forth flow across the " strath " to their estuaries, which are almost at right angles to the rivers and parallel to the line of hills. From the south-east the Clyde flows through to the north side and reaches the sea in the Firth of Clyde. Thus the Northern Heights are divided into the four groups of hills by these river valleys which have formed the routes into the Highlands.

Just as constant raids took place across " The Border," and all the borderland between England

and Scotland is dotted with ancient castles, so a constant struggle existed between Highlanders and Lowlanders. Time and again the Highlanders came down from their mountain fastnesses to raid the Lowlands, and in turn the Lowlanders attempted to invade the Highlands and punish the marauders. Sometimes the struggle was on other matters, but

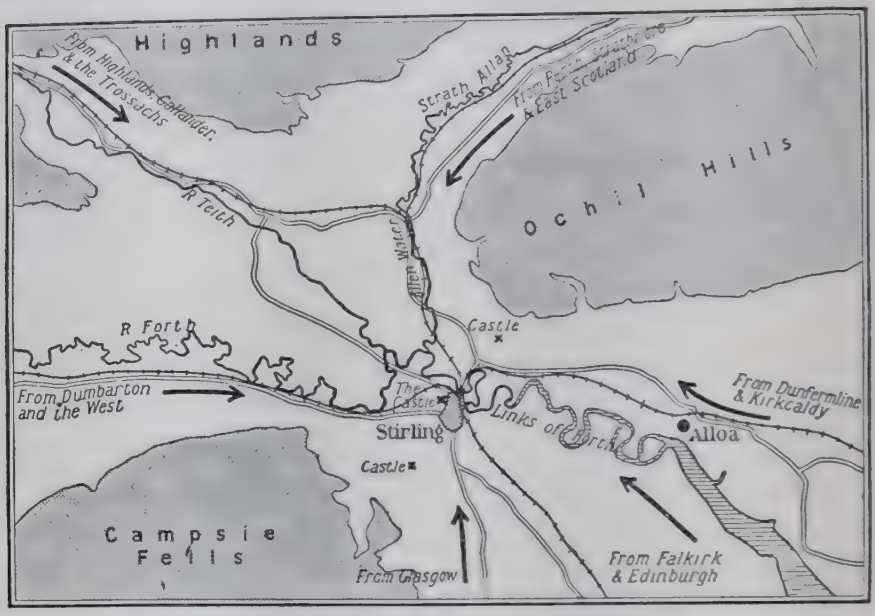

FIG. 29.—THE POSITION OF STIRLING.

always the river gaps in the Northern Heights formed the natural route.

In the broad river plain of the Forth, where the river passes between the Ochil Hills and the Campsie Fells, volcanic hills rise above the level river lands, and on one of these is built the castle of Stirling (see Fig. 29). Placed right in the valley which formed the easiest way to and from Highlands and Lowlands, it formed a key-town, and many a struggle was waged

for the possession of this fortress and the command of the road which possession gave. Similarly Perth was built in the valley of the Tay between the Sidlaws and the Ochil Hills, and Dumbarton stood in a corresponding but less important situation on the western side of the Lowlands.

Though now there is no need to keep constant watch and ward on the turrets of Perth, Stirling, and Dumbarton castles, there is to-day much more coming and going between the Lowlands and the

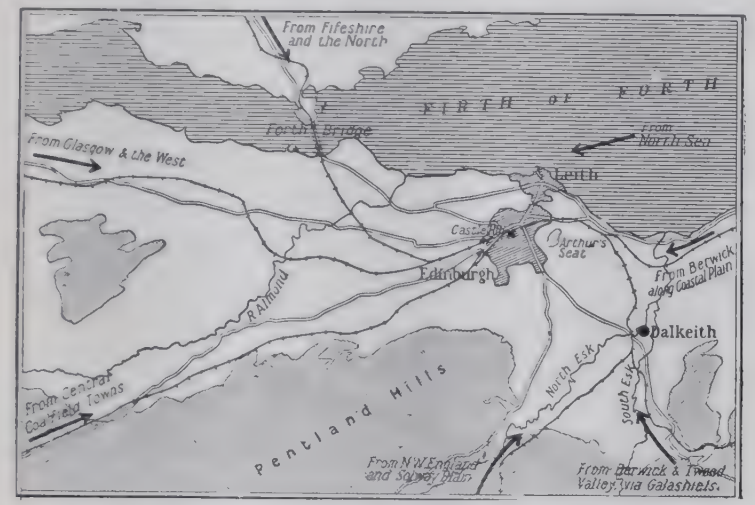

FIG. 30.—THE POSITION OF EDINBURGH.

Highlands. Goods are constantly being sent from one place to another, and people travel for pleasure or business. Consequently, these old citadels are now road and railway junctions, with the station at the foot of the hill instead of at the top, which was the best site for the castle. Perth and Stirling are to-day important centres. Dumbarton, on the other hand, is no longer important, for Glasgow has taken its place as a road and railway centre.

Corresponding with the line of the Northern Heights made by the Sidlaws, the Ochils, and the Campsie Fells, there is a southern line of heights of which the Pentland hills are the most important. Round the eastern end of the Southern Uplands and the Pentlands lies the great natural road from England. This, too, was a route along which armies as well as trade passed, and any place of good defence was therefore important. Where the Pentlands approach the Firth of Forth and so make the coastal route narrow, several volcanic hills rise above the plain. On the highest part of one of these, the castle of Edinburgh was built. Behind the castle the hill extends about a mile before it slowly sinks into the plain, and on this long narrow hill Old Edinburgh is built. The newer town has grown out on to the plain, especially towards the sea and the port of Leith, so that Leith and Edinburgh to-day really form one town (see Figs. 30 and 31).

Rivers and hills thus divide the Central Lowlands into a number of lesser regions. Only along the course of the Clyde and Forth Canal and the lower courses of the rivers is the land really lowlying ; the greater part is rolling hilly country of great agricultural value. The Plain is too far north to grow the same crops as the Plain of England, or perhaps it would be better to say that it takes longer for crops to ripen in Scotland than it does in England.

Round Lanark and along Clydesdale orchards and market gardens grow fruit and vegetables for the large towns of Glasgow, Hamilton, and Motherwell. Ayrshire and the west, like the western counties of England, have large herds of cattle for both milk

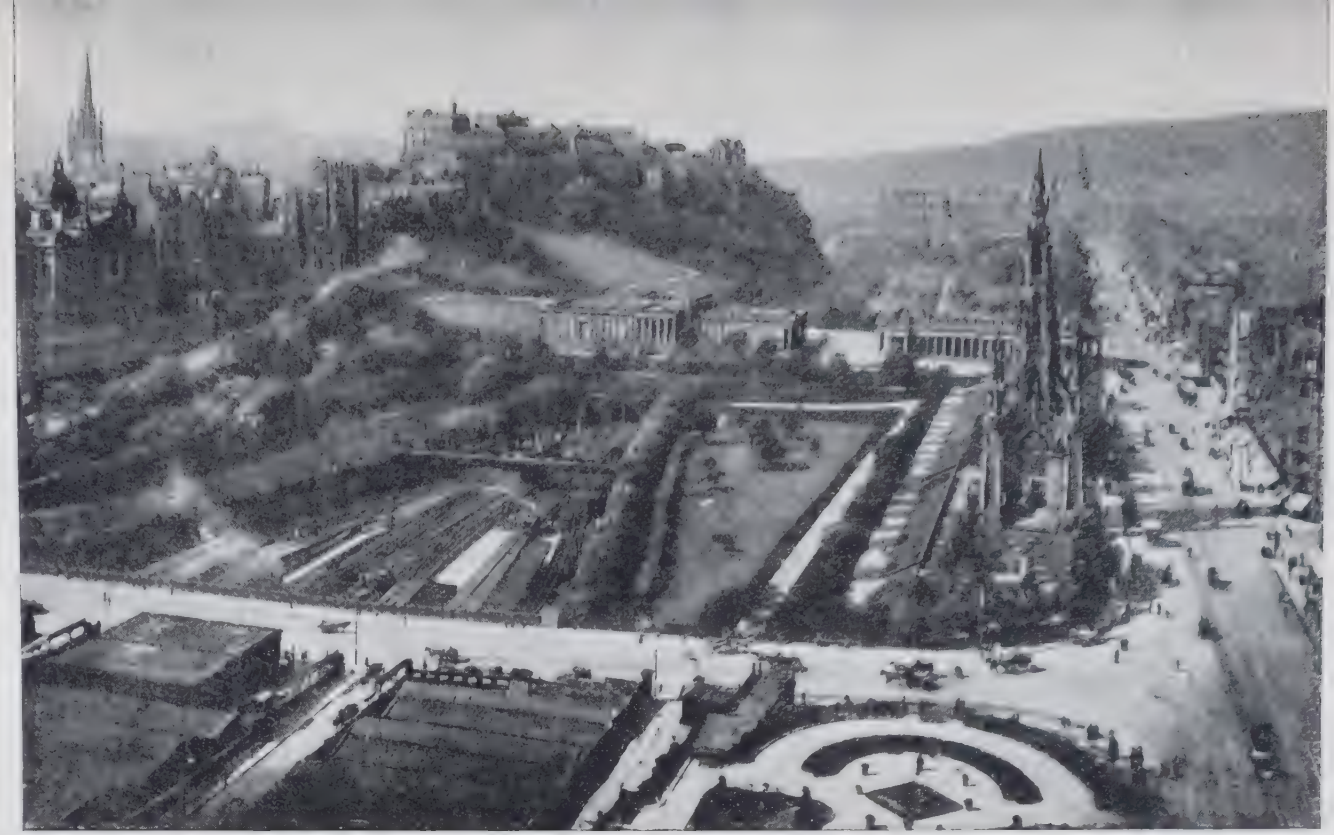

Photo by Valentine & Sons, Ld.

FIG. 31.—EDINBURGH—CASTLE ROCK WITH THE PENTLAND HILLS IN THE DISTANCE.

Old Edinburgh is seen extending from the castle along the hill ridge. Princes Street, famous for its beauty, is to the right, and between the old High Street and the modern shopping centre of Princes Street is the railway station, hidden in a depression alongside the hill. The monument in the foreground was erected to the memory of Sir Walter Scott.

and meat, and the towns of Ayr and Maybole have leather and boot and shoe factories.

In the east, along the Plain south of the Firth of Forth, is one of the most important wheat-growing regions in Britain. Field after field of corn may be seen as in the eastern counties of England, though in the north the harvest is from a month to six weeks later than it is in Norfolk. Fifeshire and to the north of the Firth of Tay are also important farming lands, and the " Carse o' Gowrie " is well known.

In the case of England we noticed how the new uses of coal did not directly affect the agricultural plain, for the coalfields and the new industrial towns clustered round the Pennines. In Scotland, however, the coalfields are found in the Central Lowlands, so that the new industries of coal and iron have grown up in the midst of the agricultural plain.

The principal coalfield is the one that extends from the River Clyde eastwards almost to the Forth. Collieries, blast-furnaces, iron and steel works find employment for thousands of workers. Consequently there is a cluster of mining and manufacturing towns, of which the principal are Hamilton, Wishaw, Motherwell, and Coatbridge. Bridges, girders, railway waggons, locomotives, and rails are some of the goods manufactured. We have seen in the case of the Tyne that shipbuilding could be carried on if a suitable waterway were near the iron works. The Clyde from Glasgow to Greenock has very many shipbuilding yards, where steel plates and enormous engines are required for the numerous ships annually launched on the Clyde.

The small coalfield in Ayrshire on the west supplies

the coal for some important engineering works, as well as exporting coal to Belfast and north-east Ireland. In the east both north and south of the Firth of Forth is another coalfield of considerable importance. From some of the coal oil is obtained, while some coal is exported. The group of Fifeshire towns of which Kirkcaldy is the chief, manufactures linoleum and similar goods, while Dundee farther north manufactures hemp and jute goods, such as ropes, sailcloth, and sacks. Thus we are able to see that though the Central Lowland is the least in area of the three regions of Scotland, it is by far the most important for its population, its agriculture, and its industry.

SUGGESTIONS FOR PRACTICAL WORK

1. Draw sketch-maps to illustrate the sites of the following cities: Perth, Glasgow, Dundee (see Figs. 29 and 30).

2. Which is the Waverley Route? Why is it so called?

3. Why is it that the majority of the people of Scotland live in the Central Lowlands?

4. Find out with regard to the counties of Haddington and Renfrew (i) the number of cattle per square mile or 1,000 acres, (ii) the number of sheep, (iii) the proportion of the land used for growing wheat, (iv) the proportion of arable land. How do you account for the difference you notice between these figures?

5. Can you name any important battles which were fought near Stirling? Why is it that this area has been the scene of so many struggles?

6. Find out the chief industries carried on in Edinburgh and in Dundee. Account for their location in these cities.

CHAPTER XII

THE HIGHLANDS OF SCOTLAND

" Know ye the land of birk and rowan,
The land of strength and sturdy pride ?
Know ye the land of brae and gowan,
Of purple heath on far moorside ?
The straths enriched by heav'n's own dew
Encompass'd round by mountains blue ?
That true Scotch land, 'tis mine."

The Highlands form a mountain home beyond the fertile lands of the Central Lowlands, as does Wales beyond the plains of the Dee and Severn. Like most mountain people, the Highlanders are proud of their country, recording its many beauties in song and story.

The general shape of Scotland may be seen from Fig. 32. The northern and eastern coasts follow fairly regularly one of two directions. Because of this, two large gulfs, which we may call the Northern and Southern Gulfs, penetrate far inland, the one to Dornoch and Moray Firths, leading to the narrow valley of Glenmore, the other to the Firths of Tay and Forth, which enter the Central Lowlands.

On the west, the general direction of the coast follows a wide, sweeping curve, but long, deep, and narrow inlets known as " lochs " make the coast exceedingly irregular. Separated from the coasts

by narrow straits similar in character to the lochs, there extends a line of islands of which the largest are Skye, Mull, Islay, and Jura. These form the line of Inner Hebrides. Beyond the Minch, the Outer Hebrides extend in a direction almost parallel

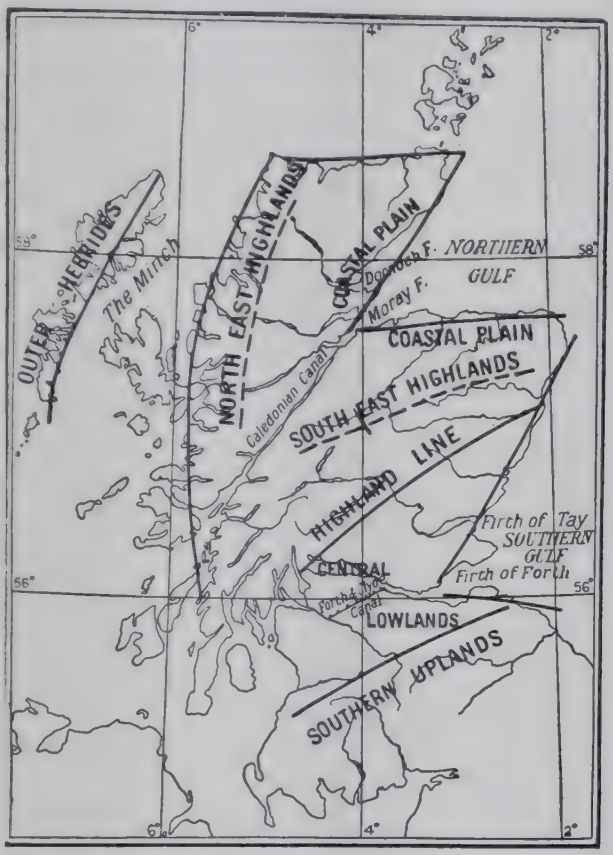

FIG. 32.—DIAGRAMMATIC MAP OF SCOTLAND.

to the coast. The largest of these Western Isles is Lewis and Harris, on which stands the town of Stornoway.

Fig. 32 shows that certain features of the Highland plateaus are best understood in relation to the coasts.

Photo by Valentine & Sons, Ltd.

FIG. 33.—A SCENE AMONG THE LOCHS OF THE WESTERN COAST OF SCOTLAND.

We have seen already that the Northern Gulf, Moray Firth, Glenmore, and Loch Linnhe divide the Highlands into two parts, the one to the north-west and the other to the south-east. By drawing the water-partings of both divisions it will be seen that the longer rivers flow into the Northern Gulf and that the land slopes more gently eastwards than it does towards the west. Indeed, the relief map shows how the plains of the Central Lowlands and Strathmore extend north-eastward round the Grampians to encircle with varying width the shores of the Northern Gulf.

Fig. 35 also shows this by indicating the moorland pasture and the cultivated lands along the coast. The northern latitude, the poorness of the soil, and the general altitude of the country make the greater part of the plateaus inhospitable and almost uninhabited. Few plants can grow and cultivation is almost impossible on the cold, wind-swept moorlands.

High granite masses rise 3,000 ft. and more above the plateau level. Ben Nevis, the highest peak in the British Isles, rises well above 4,000 ft. From Ben Nevis in directions northwards and north-westwards, forming the water-parting already mentioned, similar granite masses extend in Ben Attow and Ben Dearg in the north-west Highlands, Cairngorm and Ben Macdhui in the south-east Highlands.

These higher regions are still more bleak and barren than the general plateau lands. The most fertile regions are found in the glens and river-valleys. From the south and east the valleys of the Tay, Don, Dee, Findhorn, and Spey, with their

tributaries, lead right into the highlands, giving sheltered and comparatively fertile lands amid the wilder moorlands (see Fig. 36). Elsewhere are narrow

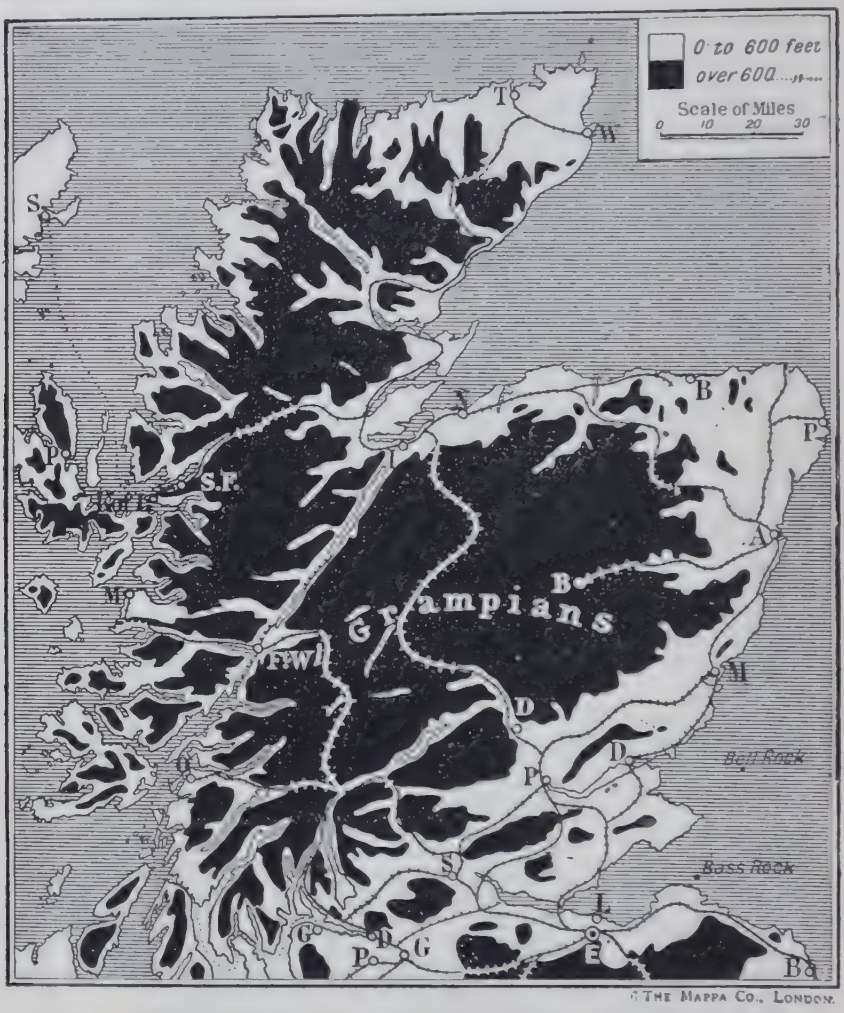

FIG. 34.—THE RELIEF AND RAILWAY ROUTES OF THE SCOTTISH HIGHLANDS.

glens similar in character to Glenmore and the western lochs, often in directions parallel to the lines which bound the coasts, as shown on Fig. 32.

Frequently these glens and valleys contain long narrow lakes or " lochs " in which are reflected the steep hillsides and towering mountain tops.

FIG. 35.—THE MOORLANDS AND FARMLANDS OF SCOTLAND.
Compare this map with one showing the relief of the land, e.g. Fig. 34.

To those who by farming and stock raising try to make a living in the Highlands, life is a hard struggle. The lonely shepherd with his dog does not

Photo by Underwood Press Service

FIG. 36.—BALLATER—A HIGHLAND SCENE.

Notice the character of the mountains or rather plateaus, the low-lying land in the great bend of the river, the old part of the town on

find such profits from his flocks as do the sheep farmers of Lincolnshire or the Downs, nor does the yield of barley in the glens compare with the yield in the Central Lowlands or the valleys of northern England. This is particularly true in the west and north and on the western isles of the Inner and Outer Hebrides. There the "crofters," or small farmers, find it very difficult to make a living. The small, low, hut-like houses, the primitive farm implements, the small, shaggy ponies, and the general appearance of farm and village are signs of poverty rather than wealth. During the long winter, when outdoor work is scarcely possible, the crofters and their families in the western glens and islands spin and weave the wool taken from their sheep, making a coarse but durable "home-spun" cloth known as "Harris tweed."

But difficult as the Highlands may be for those who live there, they form a valuable playground during the summer and early autumn for the tourist and the sportsman. Few places in the British Isles can compare in beauty with the western sea-lochs or such inland beauty spots as the Trossachs. A cruise along the western coast compares in many respects with a cruise along the coast of Norway, except that no glaciers can be seen on the high plateaus above the lochs. But the "lochs," like the "fiords," combine the beauties of the sea with those of the mountain. From the long narrow inlets steep-sided hills and mountains rise sheer from the water's edge, while here and there peeps into other lochs and valleys add to the general beauty of the scene, especially when the setting sun throws its last rays

' *Photo by Underwood Press Service.*

FIG. 37.—HIGHLAND SHEEP (HORNED) AND LAMBS.

along the loch to bathe in the soft evening light the distant peaks and moors.

Equally beautiful are the inland scenes of lake and mountain such as are found in the extreme south of the Highland region in the district of Loch Lomond and Loch Katrine. The heart of this beautiful district, just below Loch Katrine, is "The Trossachs," which with the surrounding country is so well described in "The Lady of the Lake" by Sir Walter Scott. The well-wooded glens, the open moors of grass and heather above, and higher still the towering heads of such peaks as Ben Lomond and Ben Ledi, all sharply reflected in still clear water, give a picture that must be seen before it can be fully realised.

"And thus an airy point he won,
Where, gleaming with the setting sun,
One burnished sheet of living gold,
Loch Katrine lay beneath him rolled;
In all her length far winding lay,
With promontory, creek, and bay,
And islands that, empurpled bright,
Floated amid the livelier light;
And mountains, that like giants stand,
To sentinel enchanted land.
High on the south, huge Ben-venue.
Down to the lake in masses threw
Crags, knolls and mounds, confusedly hurled,
The fragments of an earlier world;
A wildering forest feathered o'er
His ruined sides and summit hoar.
While on the north, through middle air,
Ben-an heaved high his forehead bare."
("Lady of the Lake.")

But the Highlands form also the sportsman's paradise, though the sport is very different from the

Photo by Valentine & Sons, Ltd.

FIG. 38.—THE TROSSACHS—A BEAUTIFUL HIGHLAND SCENE OF SNOW-TIPPED PEAKS AND STILL LAKES.

stag-hunt described by Scott. Many wealthy men love to have a "shooting" holiday without the difficulties of time and danger which big-game shooting in Africa would involve. Accordingly it has become a profitable business to turn vast tracts of the Highlands into game preserves for grouse and deer. The "shooting," or the right to shoot the game at the proper season, is "let" for large sums of money to those who can afford it. Most of the streams, too, are full of fish, and to the sport of grouse shooting and deer stalking may be added the sport of trout and salmon fishing.

To the east of the plateau is a fringe of comparatively fertile land on which lives the greater part of the Highland population and on which are the principal Highland towns. But before we study this coastal plain, let us look once again at the position of the British Isles relative to Europe. When we read about the English Plain, we learned how frequently people and goods cross the Narrow Seas to the estuaries of south-east England. Eastwards from the Highlands of Scotland across the North Sea lies the coast of Norway with fiords resembling the lochs of western Scotland. Centuries ago, from these fiords boatmen set sail westward in search of plunder or new homes. From the map you will see that these Norse Vikings (men of the fiords) in sailing westward would reach the Shetland Islands and thence might choose one of two directions. Some went southwards toward the Orkneys and the northern coast of Scotland; others made their way toward the Faroe Islands and finally reached Iceland.

The wilder fiord-like lochs of western Scotland seem

to have been more attractive to the Norsemen than the firths of the east. Rounding Cape Wrath (the Corner Cape), they passed through the Minch with the Inner Hebrides and the Scottish coast to the eastward and the Outer Hebrides to the west. Here some made their homes, but, during the long period in which the Norse sailed the Scottish seas, others went much farther south, reaching the Isle of Man and the surrounding coasts of the English Lake District and eastern Ireland, or visiting the northwest Irish coast, where scenery similar to that of Norway or western Scotland is found.

Much of these lands—the Orkney and Shetland Islands, the Hebrides, and the western Scottish and Irish coasts—is extremely poor. The short, shaggy Shetland ponies, like the Highland cattle, are better adapted to these northern conditions and can pick up a living where horses and cattle from the English Plain could not exist. Life on these islands is very hard. Much labour produces but scanty crops, and though the sea is rich in fish, the stormy, dangerous seas render fishing difficult.

From the northern and eastern ports of Scotland fishing fleets trawl the British Seas for herring, cod, haddock, and other fish, or sail farther north to the Arctic for seal and whale. Pickled and smoked herrings and Finnan haddocks as well as fresh fish are sent from the fishing-towns to the great centres of industry.

Now let us turn to the plain between the moorlands and the sea. Along this plain lies the principal farming country of the Highlands. Of course the farther north the farms are located, the greater is the

difficulty of cultivation. We have seen that wheat is grown extensively on the coastal plain south of the Firth of Forth. North of the Firth of Tay, however, the summer is too short for wheat ; oats and barley are grown instead. On the plains, too, cattle are reared, and sheep are kept on the hill-sides.

We have learned how valuable is the North Sea for fishing, and that farther north are the whale and seal fisheries of the Arctic. Along this coast, therefore, are many fishing-ports, of which Dundee, Aberdeen, Inverness, and Wick are the most important. The long east coast is thus for many reasons the most important region of the Highlands, and would be still more important but for the long winter and cold easterly winds which make cultivation difficult. Still, there is much produce to be sent away to the large towns farther south, especially meat and fish and a certain quantity of milk.

The main railway of the Highlands runs along the east coast. Now you can see why in coming from England either by Berwick or Carlisle there is a great advantage in having bridges across the wide parts of the Firths of Forth and Tay. The Forth and Tay bridges are two of the most wonderful bridges in Great Britain, indeed we may say in the world, for even to-day there are few bridges elsewhere to equal them.

Inverness, at the head of Moray Firth and a terminus of the Caledonian Canal, is a very important centre of this north-eastern plain of Scotland. Express meat trains run from Inverness to London round by Aberdeen. Though there is a shorter line over the south-eastern Highlands, the coast route

is the more important. Indeed, during the winter the Highland route is often blocked with snow.

It is interesting to compare the east coast of the Highlands with the west. The east with its farming and fishing is important from the view point of obtaining a living, but cannot compare in its scenery with the western Highland coasts. In the west, however, beautiful as the scenery may be, there are not the same possibilities for farms and homesteads. In the small narrow valleys such as that of Glencoe, small families exist by the flocks and herds they can keep and the few crops they can grow. In this respect the life is similar to that described in the Cheviot country. There, however, the wool is taken to the mills of the woollen towns of the Tweed valley or the West Riding of Yorkshire. In the western Highlands, as in the Hebrides, the wool is often spun at home and made into the hard-wearing though somewhat coarse " Harris " tweed.

In the Highlands we may get far from the smoke and bustle of the industrial towns. Like the Lake District, it is a holiday resort ; it has other possible uses also. Thirlmere in the Lake District has been turned into a large reservoir for the supply of water to Manchester and Loch Katrine into a water supply for Glasgow. Thus the Highland water supplies the needs of a large industrial city. Another use is possible, for waterfalls can now be harnessed and made to generate electricity. This has been done in the Alpine districts of France, Switzerland, and Italy and in some parts of Norway. Here in Britain our abundance of coal leads perhaps to neglect of water power.

In the heart of the Highlands, near the Caledonian Canal, the Falls of Foyer are used to provide power for aluminium works. The raw material is brought from north-east Ireland and along the canal to the works. It is not probable that many waterfalls will be used, but we can see how, with the new inventions, even the out-of-the-way holiday resorts may be turned to value for industrial pursuits.

SUGGESTIONS FOR PRACTICAL WORK

1. Describe a tour from Glasgow by boat via the Crinan Canal, Oban, Fort William, and the Caledonian Canal to Inverness, returning to Glasgow by the Highland Railway via the Pass of Killiecrankie and Perth.

Include an account of any excursions made en route, e.g. the ascent of Ben Nevis whilst at Fort William, and illustrate your description by means of pictures from guide-books, etc.

2. Find out how the following large cities obtain their water supply: Glasgow, Birmingham, Manchester, Liverpool, Sheffield. Give some account of the methods employed.

3. On an outline map of Scotland shade the land over 600 ft. above sea-level. On the same map, but by means of another kind of shading, indicate those parts where there are (*a*) very few people, (*b*) very many people, (*c*) a fair number of people. Also mark all the towns where the population exceeds 50,000. Now write out what the map shows.

4. Draw sketch-maps to show the positions of Aberdeen and Inverness.

5. Find Cape Wrath on the map of Scotland. The word Wrath means "corner," so that Cape Wrath is the Corner Cape. How did it get its name?

CHAPTER XIII

IRELAND

Ireland differs from Great Britain in one matter of great importance. She has no large coalfields crowded with industrial towns. In the case of England, Wales, and Scotland we have seen how much the prosperity of the country depends upon the manufacture of all kinds of cotton, woollen, iron and steel goods. When the industrial works are busy, there is more traffic on the railways and roads, farmers can obtain a better price for their produce, and seaside places are crowded at holiday times.

In many ways, therefore, countries with rich coalfields are very fortunate, but those without the means for great manufactures, if the geographical conditions are suitable, can turn their attention to the production of food for the manufacturing countries. Such countries are Holland and Denmark, and in those two countries gardening and farming have reached a high standard of production.

Ireland is somewhat in the position of Holland and Denmark, though there are some important differences. It is true that she has no large coalfields upon which great industries can be based, but there are three British coalfields—South Wales, Cumberland, and Ayrshire—which by reason of their position

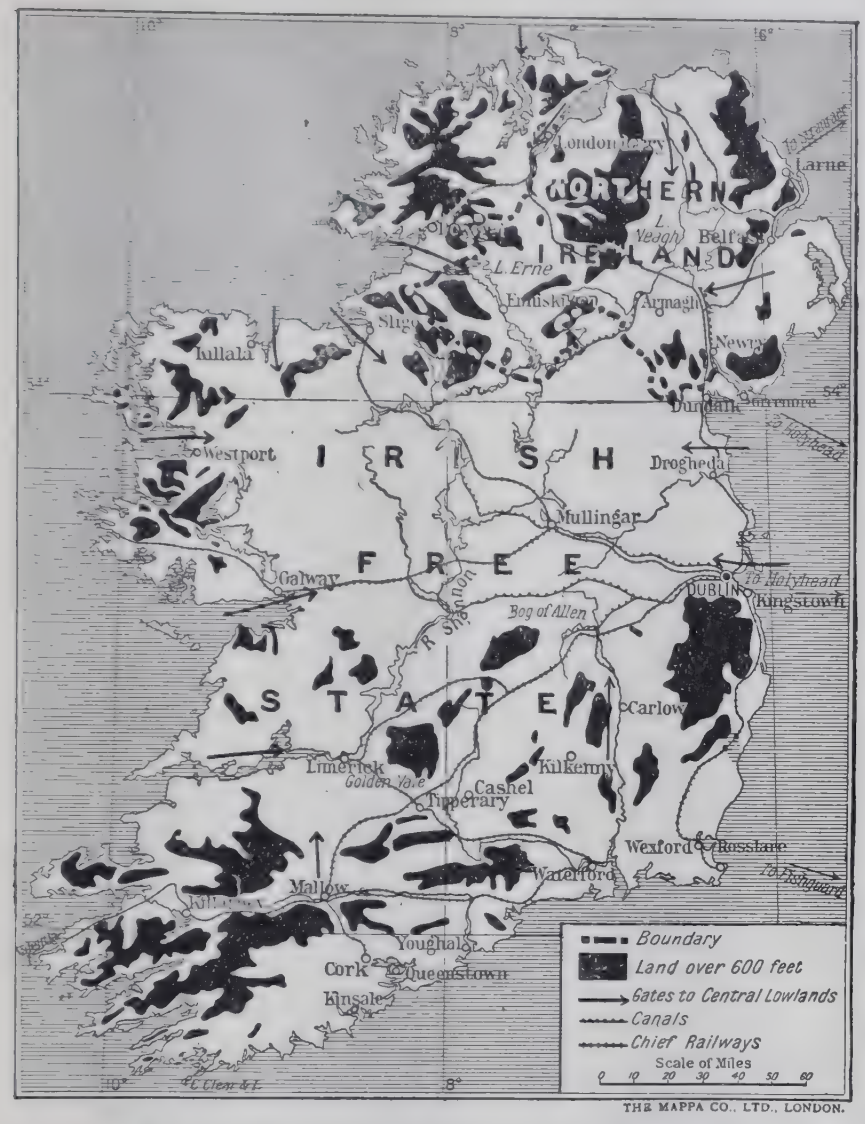

FIG. 39—THE RELIEF AND ROUTES OF IRELAND.

on the western coast could readily ship coal to the eastern parts of Ireland if there were any advantage in doing so. This is actually the case in north-east Ireland, where large shipbuilding yards have been

established on Belfast Lough. Here the excellent waterway and the ease with which coal (from Ayrshire) and other necessary materials can be obtained by sea have made Belfast one of the most important of British shipbuilding yards.

In Ulster, too, there are many other industries, of which the linen and rope manufactures are chief. This kind of occupation is due partly to the facilities of good ports, and partly to the flax cultivation, which is a special feature of north-east Ireland.

But if Ireland does not receive raw materials for manufacture from Britain in such quantities as she might, she is in a position to be a great food provider for the large industrial populations which can readily be reached by sea. The south-east ports of Cork, Wexford, and Rosslare may easily communicate with South Wales by way of the ports of Swansea and Cardiff on the Bristol Channel, or the Great Western Railway port of Fishguard.

Dublin, which is directly connected by road, railway, and canal with all other parts of Ireland, is opposite Liverpool and Manchester, the great ports for south Lancashire, the Black Country, and the West Riding of Yorkshire. North and north-east Ireland send produce from such ports as Belfast and Londonderry to northern industrial England by way of Heysham, Fleetwood, and other ports, and to industrial Scotland by way of the Firth of Clyde and Glasgow.

Ireland may, therefore, be looked upon as a great food land on the west of Industrial Britain, as the English Plain is a great food land to the east and south of it. Moreover, just as the harvest of fish

from the North Sea adds considerably to the food supplies from land, so the seas which surround Ireland produce fish, though not so abundantly as the Narrow Seas.

Ireland, then, may become a great food producing country. We have learned, however, that the production of food depends on many factors—soil, sunshine, rain, and temperature. In many of these respects Ireland is not so fortunate as England. As the westerly winds which bring most of the rain to the British Isles come from over the Atlantic Ocean, they blow first over Ireland, so that the rainfall, even of the Plain of Ireland, is much heavier than that of the Plain of England. In the mountainous west, of course, the rainfall is very heavy. This, combined with the hilly and mountainous character of the country and the poorness of the soil, makes places like Donegal and Galway very infertile and their people very poor.

In many respects the north and north-west of Ireland may be compared with the west of Scotland. Rocks, scenery, climate, vegetation, and possible cultivation are very much alike, and the poor farming and general poverty of the Hebrides and the Highlands are similar to what is found in the counties of Donegal, Mayo, and Galway.

Perhaps the most striking rock formation is that known as Giant's Causeway. The volcanic rocks of which the "Causeway" is formed assumed a column-like structure when cooling from their original molten state. Not only have the rocks vertical cracks which separate column from column, but they have also horizontal fractures which

Photo by Valentine & Sons, Ld.

FIG. 40. GIANT'S CAUSEWAY.

divide the columns into sections. These horizontal cracks have curved surfaces, some concave or hollow and some convex or outcurving. As the blocks remain in the column, the convex surface of one block fits into the concave surface of the next. When, therefore, long years of weathering break down these columnar masses, the result is extremely beautiful—column-like rocks passing down to the sea in steps, some of which hold water in their hollow surfaces and others dry and giving an excellent foothold. In one place the effect produced looks like the pipes of a gigantic organ, in another the structure looks like enormous honeycombs.

This columnar structure of Giant's Causeway is found also on the Scottish side in Fingal's Cave and on some of the other islands of the Inner Hebrides. It is believed that the two areas were once joined together.

Donegal and Western Ireland are similar to the north-west Scottish Highlands, although they are perhaps even poorer in their cultivation and farming life. In former years, though not so much since the war, thousands of Irishmen came each summer to work on English farms. At hay harvest and corn harvest the English farmer requires a great amount of extra labour and would then employ a number of these Irishmen. Most of the men who thus made their way each year to England came from these poverty-stricken western lands. Many had farms of their own, but found it more profitable to leave their wives and families to manage their own farms while they earned a little money by working for others.

What a contrast they must have found between an

English farm and their own! The low house, little more than a hut, built of large stones and thatched with turf, the pigs and fowls which lived around and sometimes in the house, the potatoes as the principal form of food, the turf or peat cutting for fuel, and above all the wild, rock-strewn, poor-looking fields so different from the English fields. From one cause or another these areas are perhaps the poorest farming homes in the British Isles, and the people had to receive special aid from the Government.

When, however, we pass from this mountainous country to the river-valleys, the land becomes more valuable and is better for farming. Londonderry, for example, at the entrance to the valley of the river Foyle, is an important port, exporting agricultural produce and importing manufactured goods and provisions such as tea, sugar, and prepared foods.

Donegal, Sligo, and Galway are of considerably less importance than Londonderry, partly because the valleys and plain of which they form the market centres have not the same value as the valley of the Foyle, and partly because they look towards the wide and stormy Atlantic. They are, therefore, little better than fishing ports, goods being conveyed to and from these centres by railway, road, and canal rather than by sea.

South-west Ireland differs from the north-west in many important respects. The long, estuary-like inlets, the direction of the mountains, and the flow of the rivers give to this part of Ireland a west-east or south-west to north-east appearance and formation. In this respect it is like South Wales and parts of south-west England.

These river-valleys, such as the Bandon, Lee, Blackwater, and Suir, have greater fertility than the valleys farther north. The scenery, too, is beautiful, and but for the difficulty of access, the Kerry Mountains would be a much more popular holiday resort than they are at present. The lakes of Killarney have a beauty all their own, and at any rate are familiar to most people through the song of E. Falconer :

"By Killarney's lakes and fells,
Emerald isles and winding bays,
Mountain paths and woodland dells,
Mem'ry ever fondly strays.
Bounteous Nature loves all lands ;
Beauty wanders everywhere,
Footprints leaves on many strands,
But her home is surely there !
Angels fold their wings and rest
In that Eden of the west,
Beauty's home, Killarney !
Heaven's reflex, Killarney."

Before we leave these south-west regions, we might notice a few points connected with communications across the Atlantic. Between Great Britain and America much business is transacted. From Valencia Island cables are laid on the floor of the Atlantic to Newfoundland and New York. Wireless stations communicate not only with stations on the opposite continent, but with ships at sea. This has many important advantages, not the least of which is that ships can communicate particulars about the weather far out to sea, which, with other information concerning the weather conditions in south-west Ireland, enable the Meteorological Office in London to gain

advanced information with regard to the weather conditions likely to affect the rest of Britain in the immediate future.

Ships sailing between north-west Europe and America usually pass the south-west of Ireland, and Cork, or rather Queenstown, which stands on an island in Cork Harbour, often receives some of this passing traffic. When the principal mail-boats went from Liverpool instead of from Southampton, letters could be sent by the Post Office from London, Liverpool, and Manchester some time after the boat had sailed and be taken on board in Queenstown Harbour. The mail train took the letters to Holyhead, thence they went by mail boat to Kingstown and so by train to Queenstown.

The greater part of the Central Plain is limestone, similar to that which forms the Pennines. In the latter case, however, the limestone rocks have been folded into a mountain system by enormous earth pressures. Rivers have carved their valleys into the sandstone above the limestone and into the limestone itself, giving the moors and dales of Lancashire, Yorkshire, and Derbyshire. On the flanks to east, south, and west the coal has been preserved, forming our modern English industrial areas, but only in one or two small areas has coal been preserved in Ireland, for in that country the great sheets of limestone, instead of being folded, have remained more or less horizontal.

This structural feature of Central Ireland has caused the rivers to have but a sluggish flow with wide plains for their valleys. Moreover, since limestone is slightly soluble in rain water, many of the rivers have

Photo by Valentine & Sons, Ltd.

FIG. 41.—IRISH PEASANTS CUTTING AND STACKING PEAT.

Notice the scattered houses and the poor appearance both of the bog and the hill-side and hill-foot.

wide swellings in their course, giving the appearance of a string of lakes. Such, for example, are Upper Lough Erne and Lough Erne on the river Erne, and Lough Ree on the Shannon. Indeed, so low-lying is the whole plain that it is difficult to pick out the separate river courses. This, of course, has made easy the construction of canals, and Ireland has quite a network of waterways radiating principally from Dublin. Elsewhere on the limestone plain solution has made extensive hollows which have become water-logged swamps. Here *sphagnum* and other bog plants grow and have grown for centuries and centuries. Though these bogs have little or no agricultural value, fortunately in a country where coal is so scarce they can be used as a source of fuel. In most parts of Ireland peat cutting is an essential occupation if fuel is to be obtained for winter use (see Fig. 41).

On the Central Plain the excessive rain prevents the cultivation, to any extent, of such crops as wheat which require sunshine and fine weather, at least at harvest-time. Under the moist and mild conditions grass is rich and plentiful, and many large farmers find the keeping of cattle and the rearing of horses the most profitable farming occupation. Root-crops, such as potatoes and turnips, also do well, and these form food for the stock in winter.

But though the west and centre of Ireland have these many disadvantages, there are other regions which are just the opposite and are known for their richness and productivity. The Golden Vale, north of the Galtee Mountains and including the upper valley of the river Suir, is, as its name suggests, one of the richest vales in Ireland. Horse and

cattle rearing, as well as cultivation in this region, make Tipperary and Clonmel important market centres.

South-east of the Wicklow Hills leading down to the sea is another well-known vale—the Vale of Avoca—of which the following poem has been written :

"THE MEETING OF THE WATERS"

"There is not in the wide world a valley so sweet,
As that vale in whose bosom the bright waters meet;
Oh! the last rays of feeling and life must depart,
Ere the bloom of that valley shall fade from my heart.

"Yet it *was* not that Nature had shed o'er the scene
Her purest of crystal and brightest of green;
'Twas *not* her soft magic of streamlet and hill:
Oh! no—it was something more exquisite still.

"'Twas that friends, the beloved of my bosom, were near,
Who made every dear scene of enchantment more dear,
And who felt how the best charms of Nature improve,
When we see them reflected from looks that we love.

"Sweet Vale of Avoca! how calm could I rest
In thy bosom of shade with the friends I love best,
Where the storms that we feel in this cold world should cease,
And our hearts, like thy waters, be mingled in peace."

(THOMAS MOORE.)

In spite, therefore, of the absence of great coalfields and the poor character of the western highlands and the central bog lands, Ireland can develop agriculture and stock raising for the markets of Great Britain. Irish horses are famous over Europe and other parts of the world; Irish cattle are brought over to Britain and fattened for market; while

Irish bacon, butter, and eggs reach Great Britain in large quantities. The volume of trade in all these commodities is capable of great expansion.

Unfortunately the development of Ireland has been hindered by its political difficulties. North-east Ireland, where the principal industries are, has long been occupied by people from England and Scotland. They have, therefore, always had the closest tie with Britain, and have stood for *Union* and co-operation. In the remainder of Ireland there has been a strong feeling that Ireland should be a self-governing country. In order, if possible, to give peace to all parties, the British Parliament has now granted this freedom to Ireland if the people wish to have it. Unfortunately there are still great difficulties in the way. The six north-eastern counties (Northern Ireland) desire to remain in union with Britain. Therefore though they have a separate government with its capital at Belfast, and a Parliament of their own, they continue to send representatives to London. The rest of Ireland has been formed into the Irish Free State with its capital at Dublin. The Free State is thus as independent as Canada, the King being represented by a Governor-General. In all other particulars of their home government the Irish are independent of Great Britain.

Perhaps some day the Free State and Northern Ireland may wish to unite, in which case it is quite possible for them to do so. Once the difficulties of government have been settled, we may look forward to a future of great prosperity, for industries may well grow up round the ports of the eastern coast, and the food from the agricultural lands

should find a good and accessible market in the industrial regions of Britain.

SUGGESTIONS FOR PRACTICAL WORK

1. Work out by means of the map three routes from London to Ireland and compare the lengths of the railway journeys and the lengths of the sea passages.

2. Why do the railways, roads, and canals converge on Dublin and not on Galway ?

3. Draw a sketch which would show the importance of Waterford as a port for the produce of south-east Ireland.

4. Make a sketch of the Irish Sea and its margins to show (i) the industrial areas of Great Britain, (ii) the chief agricultural areas of Ireland, (iii) the ports between which goods might be exchanged. In writing, state the commodities which cargo-boats would probably carry in journeying (*a*) from Ireland to Great Britain, (*b*) from Great Britain to Ireland.

5. Find out all you can about the formation of bogs. Do you think their economic value balances their disadvantages ? Give details of each.

6. With which parts of Great Britain can the following parts of Ireland be compared: Donegal, Antrim, Kerry, Wicklow ?

7. Find out why the name Giant's Causeway was given to the remarkable structural features of north Antrim.

8. Why is it that cable, wireless, weather, and ship-signalling stations are established in western and south-western Ireland ? Give details of the exact location of each.

CHAPTER XIV

COMMUNICATIONS OF BRITAIN

When first we looked at the British Isles lying off the north-west coast of Europe, we saw them as a single group of islands and called them the home of the British. Then we saw how very different from each other the regions of Britain are, and how different, in consequence, are the people and their occupations. Few people inhabit the wild moorlands, and at best the land is suitable only for rearing sheep, cattle, and ponies. On the English Plain and similar fertile lands, farming is carried on and the areas are dotted with farms, villages, and market towns. The coal-fields round the Pennines, in South Wales, and the Central Lowlands of Scotland have on them close groups of large industrial towns manufacturing all kinds of woollen, cotton, iron, and steel goods.

Now we must try to think of all these parts closely united to each other. Long, long ago, before the days of railways, motors, posts, and telegraphs, each little village or town lived almost to itself. Its inhabitants grew or made almost all that they required, and they received and heard little from the great world outside. The " home " was very small because the needs were few and communication difficult.

To-day even the poorest " home " depends upon thousands of people in all parts of the world. If you make a list of all the people who have helped to provide you with clothes and food, you will find how much you owe to people of whom you have never heard. Not only are there the people you know, the butcher, baker, milkman, and so on, but there is the sheep farmer of Australia, the cattle farmer of the Argentine, the corn grower of Canada, the tea grower of China, the negro cocoa grower in West Africa, and very many more besides. In the next chapter we shall see how Britain trades with the great world beyond the seas and oceans. In this chapter we must notice how goods and people may travel from one region to another within the British Isles themselves.

When the Romans came to Britain they constructed great military roads throughout the country, along which they could march their troops or send slaves, lead, and wheat to London and also to Rome. After the Romans left and the English came, these roads fell into disuse and were almost forgotten, since the English settled in their farm villages and used the rivers as their chief means of communication.

During Norman and Angevin times men walked or rode on horseback, and goods, such as the wool which Britain in those days exported to Flanders, were carried in " packs " on the backs of horses. Later, when coaches came into use, the roads were so bad that it was no uncommon experience for the coaches to overturn in the deep ruts or sink axle-deep into the mud, especially during the bad weather of winter. In those days a journey by stage coach from London to York was a real adventure, not

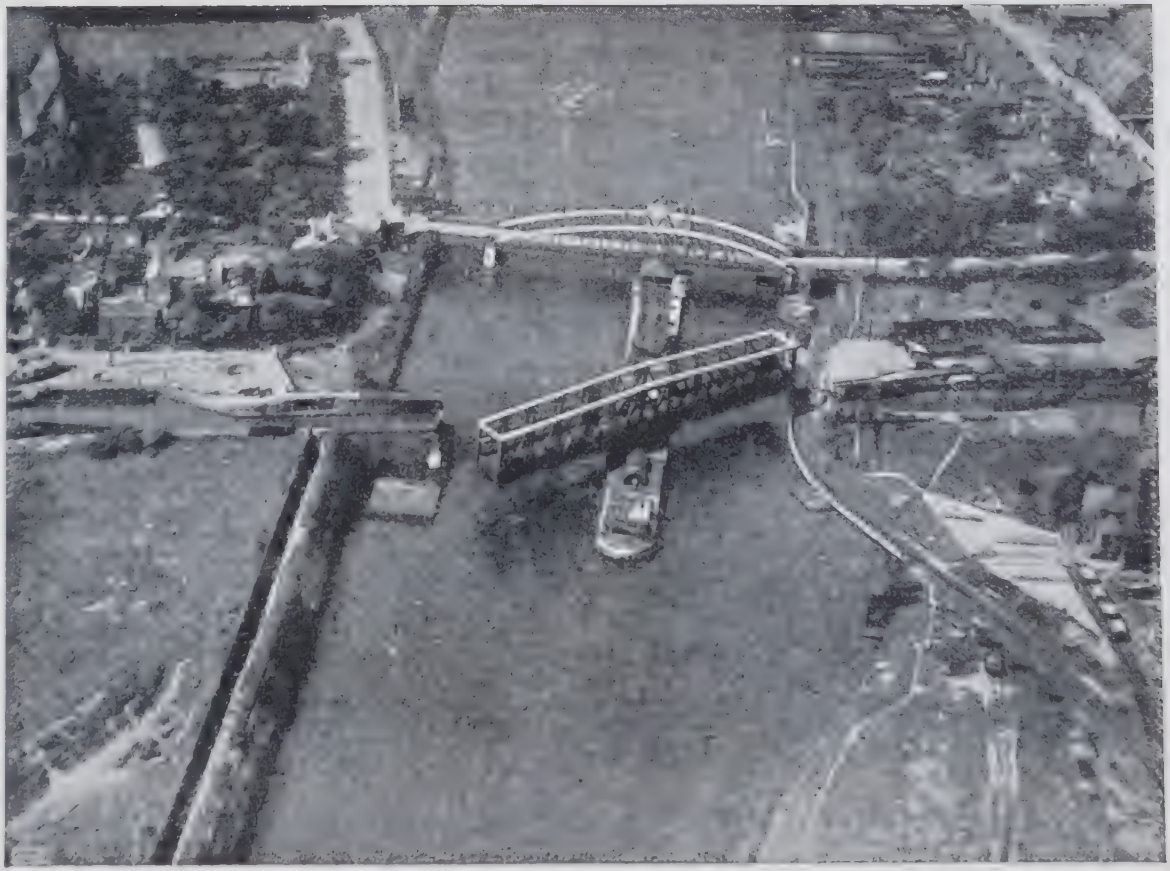

Photo by Airco Aerials, Ld.

FIG. 42.—THE MANCHESTER SHIP CANAL.

This air photo shows how a road and a canal (the Bridgwater) are carried across the Ship Canal at Barton. Both canal and road " turn " in order to allow large vessels to pass. Which was " turning " at the time the photograph was taken?

merely because of the danger of highwaymen, but also because of the condition of the roads.

The real change in the means of communication and transport came at the same time as the inventions we have noticed in connection with the use of coal and iron. At this time the best roads were those made by the Romans hundreds of years before. Coal and iron-ore are extremely heavy goods to carry by pack-horse. So, too, is limestone, which at that time the farmers required in large quantities to burn for lime to spread upon the land. Even though the roads were improved, these articles were very heavy and difficult to carry.

To solve this difficulty, an engineer named Brindley showed how to make canals. In the first place such channels must be made water-tight, and in the second place they must be moderately level. Once the canal was made, a horse could draw or haul a barge with many tons of coal or limestone. It is not surprising, therefore, that just about a hundred years ago, when coal was coming very much into use, a network of canals joined the various parts of England together. From Fig. 15 you can see how the four river-systems of the Mersey, Trent, Thames and Severn were connected, and most of these canals are still in use.

In Ireland and the Central Lowlands canals were made later, but the most remarkable canal system is perhaps that which crosses the Pennines joining South Lancashire and the West Riding of Yorkshire.

Where it is necessary to carry the canal uphill, this can only be done by having a great reservoir of water at the highest point, and then preventing the

Photo by Airco Aerials, Ld.

FIG. 43.—SALFORD DOCKS.

An air photo of the extensive docks at the head of the Manchester Ship Canal. Notice the methods adopted for dealing

water from running away uselessly down the canal by means of locks, which can be opened whenever boats need to pass, and afterwards closed to prevent loss of water.

Many of the canals constructed so long ago have fallen into disuse, and everywhere one may see these waterways choked with weeds and rushes and with locks broken down and little or no water in them. Only in a few special places, such as shown in Fig. 15, are the canals still in use. Carriage by water is so cheap that many people think we ought to improve our canals and use them once again. In France, Belgium, Holland, and Germany the canals are very important. We, on the other hand, have long and indented coasts with rivers navigable for some distance inland, that perhaps for the short canal distances it may not be worth the cost of improving the inland waterways except in special cases. Figs. 43 and 44 show two views of the Manchester Ship Canal—the most important canal in Britain—by means of which ocean-going ships can reach Manchester, a city more than thirty miles from the sea.

Soon after the first canals were made, the wonderful inventions of the locomotive and railways gave a quicker though more costly means of communication. Every year a greater number of short railways were made to carry goods and passengers. These short lines were extended until they joined each other, and in time the many small railway companies were united to form comparatively few but very large railway companies. Once again there has been a uniting of railways, so that now we have the following great companies :

1. London, Midland, and Scottish Railway.
2. Southern Railway.
3. London and North-Eastern Railway.
4. Great Western Railway.

FIG. 44.—THE PRINCIPAL RAILWAYS OF GREAT BRITAIN.
This map shows the new grouping of the railways into four main groups.

These, it will be seen from Fig. 44, radiate from London across the English Plain to the industrial

regions of the north and west with extensions to Scotland and Ireland. These are the great main-line railways along which goods and passengers travel from region to region. On the London and North-Eastern Railway, for example, fish is carried to

Photo by Central Aerophoto Co., Ld.

FIG. 45.—WESTMINSTER BRIDGE AND WATERLOO STATION FROM THE AIR.

The whole of Westminster Bridge is shown. The splendid building about the centre of the picture is the new County Hall. The station is Waterloo. Name the remaining bridges and any other important buildings. What is the one which just comes into the bottom left-hand corner? On which bank of the river is it?

London and other large towns from Grimsby, Yarmouth, and Lowestoft, farm and garden produce from the eastern counties, coal from the York, Derby, and Nottingham coalfields, woollen goods from the West Riding, machinery from the Tyne district, fish and meat from as far north as Inverness. From

London, there are distributed goods which come into the Port of London or which are manufactured in London ; tea, sugar, wool, frozen meat, furniture, clothes, books, newspapers, and many other things. Then there is the constant coming and going of people to the great metropolis which is the business and political centre of the British Isles.

So we might take each railway in turn and notice the character of the goods which travel up and down the lines. In addition to these main lines, there are of course important local lines. From each great town, railways lead off in all directions. If it is a market town, then the surrounding railways run to the farming villages, bringing into town the milk and farm produce and taking out all the various goods that one may find in the village shops. If the town is one of an industrial group, such as the towns of South Lancashire, then the railways serve for the easy exchange and transport of goods within the area. Day and night the railways are busy and long trains are travelling at various speeds in all directions, binding Britain into a single working country.

The invention of the motor-car and motor-lorry has made the roads more important than they were in the days of horse-traffic. Unfortunately the roads made thirty or more years ago are not strong enough for the heavy traffic which now travels along them. These "trunk" roads, as they are called, have now to be rebuilt with stronger foundations and a much stronger surface. The greater quantity of traffic has made them also too narrow, while the sharp turns and bends of the old roads are dangerous when cars are racing along at twenty-five, thirty, or

more miles per hour. Not only are these main roads, therefore, being strengthened, but they are being widened and straightened.

Nowadays, too, for the conveyance of special goods and passengers, aeroplanes journey between some of the larger towns. No doubt it will be a long time

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FIG. 46.—SCENE AT CROYDON AERODROME.

It shows a passenger-carrying aeroplane setting out for Paris.

before ordinary people will make regular use of aircraft, but motors and railways have made it easy to send goods from place to place. But these are only part of the wonderful system of communications which we have. Letters, newspapers, telegraphs and wireless enable us to send and receive news very

quickly. Have you ever thought how wonderful any one of these is? We buy a newspaper in the morning and we read what all the world was doing but a few hours before. We receive a letter at breakfast time which a friend two or three hundred miles away wrote only the previous evening.

We may even go to the telephone and in a few minutes be talking business with a man in his office a hundred miles or more away. We may sit at home in the evening and listen to a concert which is being given many miles away. No wonder our "home" has changed from what it was in the days of our great-grandfathers. To-day and every day we are in touch with all the world. To us, our "home" is the centre of the world. It is the little area that we know so well and in which we work, but which has its connections with the great world of which our "home" is but a part.

SUGGESTIONS FOR PRACTICAL WORK

1. Why is the transport of goods by water cheaper than by rail?

2. What effect do you think the construction of a ship-canal joining the Firths of Forth and Clyde would have upon the future development of Scottish trade, especially upon that of Glasgow?

3. On page 162 it is stated that we might take each of the great railways in turn and notice the character of the goods which travel up and down its lines. Will you do this?

4. On page 162 you will read that day and night the railways are busy. Does the night traffic differ very much from the day traffic? What kind of traffic is especially best carried on during the night? When would special fish and fruit trains run?

5. If you live near a meeting-place of several roads, examine the nature of the traffic passing in all directions. Where have the goods come from, and where are they going? What work is done in the immediate neighbourhood?

6. Why is it that there is a close connection between the relief of the land and the route of a railway?

CHAPTER XV

BRITAIN AND THE WORLD

"The sea! the sea! the open sea!
The blue, the fresh, the ever free!
Without a mark, without a bound,
It runneth the earth's wide regions round."

(PROCTER.)

IN days of old when ships were small, the seas, often lashed into fury by the storms, prevented easy communication between land and land. In those times the British Seas formed a sure shield for Britain's protection. To-day, with larger and swifter vessels constantly in touch by wireless with the land and with each other, the oceans form magnificent highways to all parts of the earth. Railways and roads connect the various regions of the country, but the seaways join Britain to all other parts of the world. It is the one great link of the British Empire and the one great means by which Britain can trade with foreign countries.

First of all, however, let us see the kind of goods we export or send out of the country, and the kind of goods we import or bring into the country. Our exports are principally manufactured goods. On the coalfields we make far more cotton, woollen, and steel goods than are required at home. These therefore we wish to send abroad to the places where people

live who want these goods but do not make them for themselves. Our principal exports are manufactured goods, and we need for ourselves—and much more besides—all the food and all the raw material, such as wool, iron-ore, and timber, that we can

Photo by Central Aerophoto Co., Ld.

FIG. 47.—AIR VIEW OF WEST INDIA DOCK, LONDON.

Notice that the river is on both sides of the docks. How is this possible? Make a sketch-map to illustrate your answer.

produce. One article only of this kind we export in great quantities. From South Wales and the Northumberland and Durham coalfields great quantities of coal are shipped to all parts of the world.

In return for these goods we import food and raw materials. Wheat, flour, meat, bacon, fruits, tea, raw cotton, raw wool, iron-ore, timber—these are

but a few of the many things which we require. Some, like tea and cotton, we cannot grow here at all. Others, like wheat, meat, and timber, we have, but not in sufficient quantities for our needs, for forty-seven millions of people live in these isles.

Now let us look at the British Isles in their relation to the sea that "runneth the earth's wide regions round." To the south and east are the Narrow Seas that separate Britain from Europe. We have seen already that between the British and Continental ports steamers run regularly for mail and passenger services. But besides them, cargo boats of all sizes and kinds run to and fro across the Channel and North Sea between the British ports of Southampton, London, Hull, Newcastle, and Leith and the Continental ports of Havre, Rotterdam, Hamburg, Danzig, and Copenhagen. From the western countries of France, Belgium, Holland, and Germany come some food-stuffs as fruit, vegetables, cheese, and butter; but much more important are the iron and steel goods (generally in the form of machinery), chemicals, glass, and silk goods. Denmark sends butter and other dairy products, and from the Baltic comes timber in the form of pit-props, planks, or even doors, window-frames, and staircases.

To the west of Britain rolls the vast North Atlantic, once a great barrier to men, now sometimes scoffingly called "the Herring-pond." On the far side are the two British dominions of Canada and Newfoundland, and the large English-speaking but entirely independent country of the United States. Though in both the States and Canada the central areas yield large quantities of food, the United States have little that

they can export. Like Britain, they export large quantities of manufactured goods both to the countries of Europe and to the rest of the world. Raw cotton from the Southern States of the United States, however, is still the important supply for the mills of South Lancashire, though now that America is manufacturing more and more of its raw cotton,

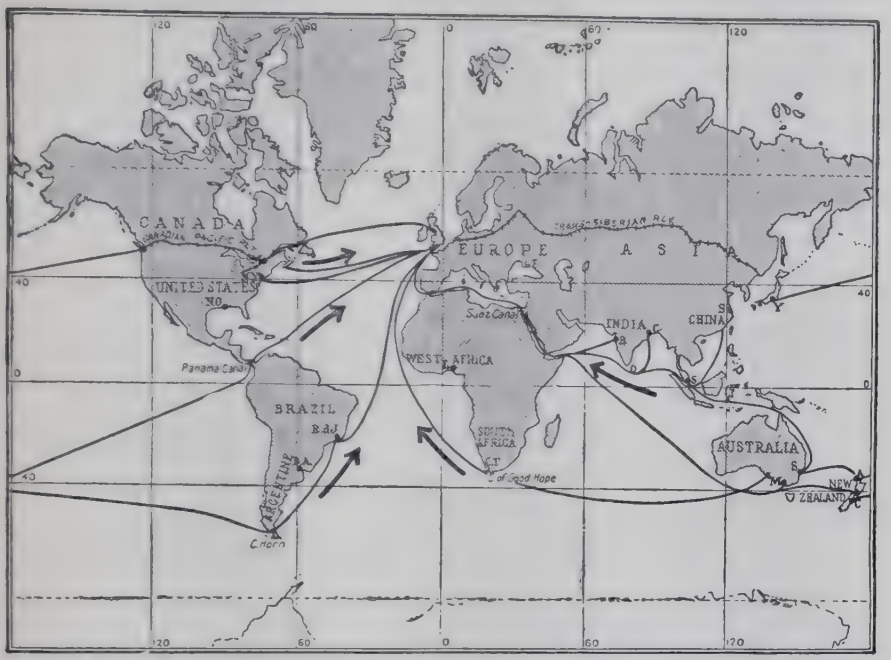


FIG. 48—THE BRITISH ISLES IN RELATION TO THE GREAT TRADE ROUTES OF THE WORLD.

British manufacturers are becoming anxious. Many other parts of the world and especially of the British Empire are being encouraged to grow cotton.

From Canada we receive wheat, meat, hides, and skins, together with timber and paper which is made from wood pulp. Thus from Montreal and Halifax in Canada and Boston, New York, and Charlestown

in the United States goods cross the Atlantic to the ports of London, Southampton, Liverpool, Manchester (via the Ship Canal), and Glasgow in Britain. East and west go the great ships exchanging the goods of Britain for those of Europe and North America.

Now, take a globe and notice how the ocean washes round the continental coasts. Towards the south the North Atlantic becomes somewhat narrower, due to the western projection of North Africa and the eastern projection of South America. Before you reach this broad ocean strait, you notice two large inland seas. In the Old World the Mediterranean and Black Seas make shipping possible in the countries of south Europe, western Asia, and north Africa. In the New World the Gulf of Mexico and the Caribbean Sea make trade possible with Central America, the southern States of North America, and the northern States of South America. But so narrow and so low is the land separating these inland seas from the Red Sea and Indian Ocean in the Old World and from the Pacific Ocean in the New World, that ship-canals have now been cut. The Suez Canal gives a seaway to the East through the Old World, and the Panama Canal gives a seaway to the East through the New World.

But we have not yet followed the great ocean-ways into the South Atlantic and thus to other regions. One great route after entering the South Atlantic passes to South Africa and, after rounding the Cape of Good Hope, enters the Indian Ocean. Thus the Indian Ocean may be entered by two routes, commonly known as the Suez and Cape routes. Once in the Indian Ocean, ships may sail to any of the lands in

Africa, Asia, or Australasia that border it, or, passing by Singapore, enter the Pacific and thus reach the ports of China and Japan.

Returning once more to the South Atlantic, the other ocean route runs to South America, rounds Cape Horn, and enters the vast Pacific Ocean from the south. The Panama and Horn routes are important for the trade of the west coast of North and South America, while trade across the Pacific to China and Japan in the north and Australasia in the south is steadily increasing. These four routes,—Suez, Cape, Horn, and Panama—link Britain with the various parts of the British Empire and with the rest of the world. In all countries railways are being constructed from the ports to inland districts, so that goods readily pass between the ship and places hundreds of miles up-country.

What, then, is our trade with these distant lands? First of all these lands are markets for all kinds of manufactured goods—railway-lines, locomotives and carriages for the countries of South America, woollen goods and machinery for Australia, cotton goods for India and China. From these countries we receive food and raw materials; wool and mutton from Australia and New Zealand; tea and silk from China; meat, hides, and wheat from Argentina; coffee and rubber from Brazil; copper-ore and nitrates from Chile; mahogany from Honduras; cocoa from the Gold Coast; palm oil and tin from Nigeria. Thus might we go on, giving an ever-increasing list of articles which ships are constantly bringing to this country.

Though but specks on the mighty ocean, the

steamers ploughing the deep in all directions form the great and wonderful means by which goods are conveyed from place to place. Nowadays, world air-routes are being planned, so that fleets of aircraft may one day traverse the atmosphere as now ships sail the oceans.

But we have seen that there are other links—the cables and the wireless stations. On the floor of the ocean lie great cables connected at the shore stations with telegraphic instruments. By these, messages may be sent to the other side of the world as easily as you can send a telegraph message to someone in a neighbouring town.

Nowadays we do not even need the cable, for by wireless telegraphy messages may be flashed into space and picked up by the delicate receiving instruments on ships or far-off land stations.

The world to-day is closely knit together by all these ties and bonds, and we, like other people, find our " home " and our " country " closely connected with other " homes " and " countries." Thus must we learn to think, not of ourselves alone, but of all those unknown to us in this and other countries who provide us with the things we need, and to remember that our work also will be for others no less than for ourselves.

ABBREVIATED INDEX

Items not in the index should be looked for under their regional heading

A

Aberdeen, 137
Aire Gap, 30, 87

B

Belfast, 142, 152
Birmingham, 58, 108
Black Country, 108
Bristol, 20, 21, 22, 81

C

Cambridge, 52, 55
Carboniferous limestone, 84
Cardiff, 76, 79
Channel Islands, 18
Chatham, 19
Cinque Ports, 61
Cotton manufacturing, 105–6

D

Dogger Bank, 19
Dover, 19, 28, 61
Dublin, 142, 150
Durham, 102

E

East Anglia, 52, 56
Edinburgh, 120

F

fens, 52
fishing, 19, 20, 137
fruit lands, 40

G

Giant's Causeway, 143–5
Glasgow, 21, 22, 119, 120, 122, 142
Goole, 104

H

Hull, 20, 104, 168

I

Irish Free State, 152
iron manufacturing, 76, 102, 105, 107, 108, 122

K

kaolin, 66
Keswick, 88, 89

L

Lake District, 89–92
Lincoln, 30, 52, 109
Liverpool, 60, 104, 106, 142, 170
London, 21, 22, 32, 58, 60, 94, 109, 160, 168, 170

M

Manchester, 60, 82, 104, 106, 142, 170
Middlesbrough, 102
Midland Gap, 81
Midland Plateau, 47, 57, 99

N

Newcastle, 102
Northern Ireland, 152
Nottingham, 55, 103, 105

O

oolitic limestone, 50, 102
Oxford, 52, 53

P

Pennine Chain, 81–9, 98
Plymouth, 19
Portsmouth, 19
Potteries, 107

Q

Queenstown, 104, 148

R

Roman roads, 155, 158
Runcorn, 107

S

Salisbury Plain, 51, 53, 54
shipbuilding, 102, 104, 105, 122, 142
Southampton, 54, 168, 170
Stirling, 118
Swansea, 76, 79

T

tinplating, 78
Trossachs, 133
Tyne Gap, 30, 87

V

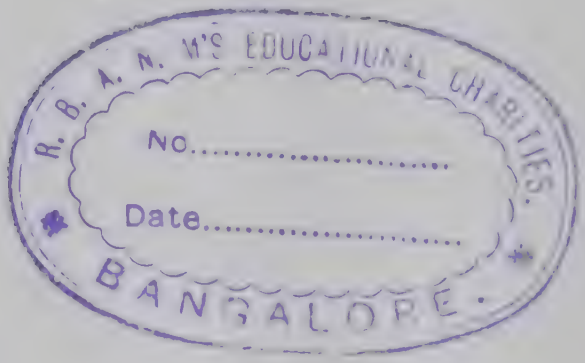
Valencia Island, 147

W

Weald, 54
Wolverhampton, 108
woollen trade, 75, 103, 104, 131, 138

Y

Yarmouth, 20, 109



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